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PHYSICIAN TO THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND-STREET; PHYSICIAN TO UNIVERSITY COLLEGE HOSPITAL.

LECTURE III.*

Delivered on March 7th, 1928.

THE first general principle in the treatment of heart disease in the child is that rheumatic disease of the heart is only one manifestation of a general disease, and the problem is not a purely cardiac question. Success must turn on a general knowledge of acute rheumatism. The second is that as far as possible convalescent treatment should be linked up with well-known central hospitals whenever the private practitioner is not in a position to take their place. There will be a great loss of purpose if a heavy drift takes place towards isolated convalescent homes. The third is that, without interfering overmuch with the liberty of the subject, increasing organisation should give all cardiac cases after childhood careful supervision in the factory, the large business-house, or elsewhere. I hold that we possess no drug or other treatment which has a specific action upon rheumatic morbus cordis, though I do not expect general agreement with this view. Lastly, we must realise that our problem at the moment is very much more than the prevention of rheumatism and rheumatic heart disease, for it includes the amelioration of the latter. In the present state of our knowledge we have not failed when a child has developed organic disease of the heart, but we fail if we do not exert all our resources to secure for the child a full convalescence and do not make every effort to prevent further attacks and to indicate reasonable occupations for later life. The problem, in general, resembles that of tuberculosis, but there is more encouragement, because at puberty the incidence of heart disease in rheumatism tends to diminish. There must be further laboratory and clinical research, for we cannot cease from efforts to decide the exciting cause, from arriving at decisions upon the nature and frequency of predisposing causes, and from investigations into a more successful medicinal treatment.

PREDISPOSING CAUSES.

There is much interesting work in progress upon the predisposing causes of acute rheumatism, and many differing views upon their relative importance. One point which I would emphasise is that acute rheumatism is particularly likely to follow when a spell of dry warm weather changes to cold winds and wet. It is not the dry weather, or the wet, upon which I lay the great stress; it is the sudden atmospheric change. Dry weather tends to dust formation and sore-throats in the large towns, and sudden cold and wet, in my experience, develop the rheumatic infection.

A good deal of attention has been directed to the infrequency of acute rheumatism in the well-to-do, but it is only a relative infrequency, for I have seen the disease occur severely in prosperous families. Again, it has been pointed out that it is not the poorest in the social scale who suffer, but those who are not actually necessitous. To explain this I fall back on my view that nervous tension is an important predisposing factor, and I believe that this is a salient feature in that particular class of life. These children often come from small families and have parents who feel the full stress of keeping a position above the fringe of careless poverty. The children are anxious to shine at school and at home, and do not possess the stolidity that many of the very poor show. I believe that damp, low-lying localities are harmful. I have never thought that damp localities or damp houses, or damp feet, are actual exciting causes, but they undermine the general health, and I am confident that the rheumatic child fares badly in such surroundings and that the rheumatism particularly tends to become intractable. I have seen too many examples to be disturbed by any statistics. I also believe that defective sanitation in a house is important as a predisposing cause.

The question of diet seems to me one which should be inquired into further in a large convalescent hospital. It has never attracted me as an important factor, and I have sometimes thought that it must be an echo from former days when gout was so much in the minds, and sometimes bodies, of our profession. Nevertheless a careful investigator, with an opportunity for prolonged inquiry, might well upset such a general impression and throw some light on this problem. For instance, Dr. Arbour Stephens has suggested that acute rheumatism is dependent upon a calcium deficiency. We certainly cannot allow any field to be unexplored in such a subject as acute rheumatism.

One statement that seems to me true, though I know it has been doubted, is that chorea is much more frequent in the elementary than in other schools. Chorea is a nervous manifestation of acute rheumatism frequently associated with heart disease, and we must strive to explain this frequency.

Our climate is in accord with the disease, for it is very variable and shows many manifestations, and its vagaries recur year in, year out. Local epidemics of acute rheumatism are very interesting and require further investigation. I have never been in the position to investigate the accurate details, but we shall now be on the watch for them and may learn some new facts. The disease is undoubtedly more frequent and more severe in some years than in others.

METHODS OF INVASION OF EXCITING CAUSE.

If we do not know the exciting cause, how can we detect its path of entry into the body? We do know that streptococci from inflamed tonsils will produce heart disease on experimental injection into the veins of animals, and that in children, particularly the very young, heart disease may sometimes follow a tonsillitis as dramatically as in an animal. I have also seen it follow immediately upon the old operation for guillotining tonsils and after enucleation.

Recently a girl was under my care in hospital for an attack of rheumatism with mitral endocarditis following tonsillitis, and the tonsils were obviously unhealthy. She made a good recovery. It is my rule to allow such cases to make a prolonged convalescence before operation, so three months later, after a change into the country, the tonsils were enucleated by a master hand. A fortnight later she was readmitted with severe pericarditis and eventually left hospital a cardiac invalid.

Another striking case came under my notice in June, 1926.

A school-girl, aged 13, who had suffered from a sore-throat and had enlarged tonsils and an attack of acute rheumatism with mitral disease, made a good recovery. Three weeks later the tonsils were enucleated, and three days after this the temperature rose and she rapidly developed a dangerous carditis with pericarditis which was almost fatal.

Incidentally, I think this case was a striking support of the streptococcal theory of the disease, for it began on the third day, which in our experimental experience was a frequent event with a virulent culture, and it reproduced precisely the events which happen when a rabbit is infected by injection. It is my belief that in such a case the child is directly inoculated with the micrococci through the raw surfaces caused by operation at a time when the susceptibility to infection is still high,

* Lectures I. and II. appeared in THE LANCET of Sept. 15th and 22nd respectively.

for we must admit that, though a child may appear to have recovered from an attack of rheumatism, we are still ignorant of the completeness of recovery.

A rather remarkable case was that of an only child, with acute pericarditis and aortic and mitral endocarditis, a clear history of sore-throat, and large unhealthy tonsils. This boy had repeated attacks of fever and tonsillitis while in hospital, but he was so ill that I was afraid to advise operation, and repeatedly delayed. Eventually he was taken from the hospital by his parents.

It seems clear, from experiment, that the tonsils must destroy infection when they are healthy, but the difficulty is to ascertain when they cease to act as a protection and become a danger. The only solution that I can see will be from collective experience, based upon the observations of many careful investigators extending over a considerable period of time. So far, I think the balance is in favour of the opinion that the removal of unhealthy tonsils by enucleation tends to diminish the frequency and severity of further attacks, even if it does not prevent them. Dr. R. Miller is of the opinion that chorea, a minor evil, rather than heart disease, is the most frequent manifestation when rheumatism again attacks a child after removal of the tonsils. There must soon be at our disposal a great mass of evidence on the number of cases of acute rheumatism and heart disease that develop in children who have had no obvious signs of the disease before their tonsils were removed. When this is published it will give us a much more definite basis upon which to build our views upon this most important question. Because removal of the tonsils does not prevent further attacks when once a child has become infected, it does not follow that removal would not have prevented the original attack altogether. Once infection has taken place, we are not yet in a position to say when it has been destroyed in the tissues of the body or where it may be hiding. If a child has had an attack of rheumatism with evidence of tonsillitis, has apparently recovered and the tonsils seem healthy, and the tonsillar glands are not enlarged at all, or only to a slight degree, ought we to advise their removal as a precautionary measure or not? If so, should we operate at the end of the acute illness or wait until the child has made a thorough convalescence? There is considerable difference of opinion upon these questions, and it is for this reason that I am anxious for evidence upon the occurrence of first attacks of rheumatism in children who have already had the tonsils enucleated; if this be frequent it must influence our procedure and make us cautious. I endeavour to judge each case individually, but the judgment, however well intentioned, may very easily be faulty because of the intrinsic difficulties. I do not think there is any practical problem in the prophylactic treatment of rheumatic heart disease that requires more immediate attention than the correct line to take with the tonsils; routine operation requires complete justification.

I have not been impressed with the origin of acute rheumatism from dental disease in childhood, and am not convinced of the frequency of an alimentary infection. Many rheumatic children, it is true, suffer from abdominal pains, chiefly epigastric; some suffer from colitis and some from acetonæmia, but these may all be the results of the established disease and not evidence of primary foci. There is clearly room for further investigation upon these questions.

Medicinal Treatment.

The medicinal treatment of rheumatic heart disease introduces another question upon which I think we, as a profession, ought to arrive at some definite conclusion. Much has been written upon the specific action of salicylates in acute rheumatism, but if by specificity is meant the action of a drug which, if used skilfully, produces the clear-cut results of a true antidote, like quinine in malaria, then I am convinced that salicylates are not specific. In recent years I have abandoned their use in the most severe forms of carditis in childhood. In some respects I have had an almost unique experience of this drug, because I was working at Great Ormond-street on cardiac dilatation when the late Dr. D. B. Lees was carrying out his well-known investigations on the use of large doses of salicylate of soda for acute rheumatism. It was then that I saw examples of its toxic action, which led to the introduction of the well-known formula combining it with double the dose of bicarbonate of soda. In the Encyclopædia of Medicine, published in Edinburgh in 1902, I pointed out the severe depression, dangerous vomiting, and fatal coma that might result from large doses of this drug in childhood, and my observations were corroborated by Prof. F. Langmead. I am now only concerned with rheumatic heart disease in the young. The value of the researches of Dr. Lees upon the use of this drug in adult rheumatic arthritis has met with ample proof, and its value for the arthritis and pains in childhood is unquestionable. For many years I used the drug for rheumatic heart disease in acute cases, in chronic cases, and as a prophylactic, but to-day I am not prepared to say that it exerts any specific action, but am of opinion that it is a *dangerous drug when given in large doses to fragile rheumatic children.* It introduces into the severe cases of carditis difficulties such as vomiting, depression, pulmonary œdema, and even coma. The temperature certainly may be lowered, but fever is very rarely any real danger, and the most virulent cases of rheumatic carditis may be practically afebrile. The only unexpected death I have had in the last five years from rheumatic heart disease was that of a little girl admitted for slight mitral endocarditis. The temperature was obstinate but not high, and my house physician, with the very best intentions, gave salicylate of soda grs. 20 every four hours—not a large dose to the enthusiast. I saw the child three days later for vomiting which, in spite of all efforts, proved fatal. So great a hold, however, has this treatment on the minds of our profession, that it is most difficult to break through its tradition. There is no alternative treatment with any claim to the term specific, and if salicylates are specific, they should logically be pushed in the severe cases.

The Ethyl-ester of Methyl-phenyl Cinchoninic Acid.

Fortunately, I have found a cinchonic acid preparation, an ethyl-ester of methyl-phenyl cinchoninic acid called "tolysin," which has some definite action in rheumatism and which is admittedly less toxic than the salicylates. I do not for a moment hold that it is specific, but it has enabled me to treat the worst cases of carditis without the anxiety of drug complications, and has satisfied the sceptic that I have at least been attempting to treat the disease. My great object has been to find a treatment which would not complicate the difficult problem of the management of severe carditis. Not only have we often to treat very nervous children, but in addition to the dangers of carditis there may be arthritis, pleurisy with or without effusion, massive collapse of the lungs, broncho-pneumonia, and chorea. In very rare cases acute œdema of the lungs, beginning, like "renal œdema," at the apices, may occur. This I have only seen in four cases, all of which had been treated with salicylates, but the number is too small to incriminate the drug wth certainty. It is a most dangerous complication, though not always fatal.

For success in the treatment of such a perilous condition as severe carditis I consider it imperative to diminish any tax on the resources of the child, and there are two clear lines of guidance. One is never to attempt paracentesis pericardii unless absolutely assured that the quantity of exudation is the real danger; the other is to explore the pleura first if doubt exists whether the distress is the result of a left pleural effusion or a pericardial effusion. If we push drugs like digitalis or salicylates, which produce vomiting, we imperil our success, for careful

feeding and the taking of nourishment are essential. To explore unnecessarily is to add to the dangers, but to calm and obtain sleep with small doses of nepenthe, and possibly some bromide, is invaluable. Tolysin has seemed to me, in small doses (grs. 5–7 every four hours), to improve the general condition, and certainly has never done harm.

Oeller in 1911 showed that the action of phenyl-cinchoninic acid was akin to that of the salicylates, but, as it also produced similar toxic effects, the tasteless and less toxic ethyl-ester was introduced. In 1912 Bendix employed the ethyl-ester of methyl-phenyl cinchonic acid ("tolysin") for rheumatism, and Chace, Myers, and Killian, in 1921, obtained good results with it is America. Boots and Miller, of the Rockefeller Institute, made a further study of its use and dosage in 1924, as had Hanzlik, Scott, Weidenthal, and Fetterman, in 1923. They found it a safe drug, though not so potent as the salicylates. Most of the observations were made on acute rheumatism in adults, and doses from 7–15 g. were used in 24 hours. In 20 cases, in which very large and long-continued dosage was employed, the only toxic effects were buzzing in the ears, headache, vertigo, nausea, and vomiting, this last in three cases. All the evidence I could collect when I began to use the drug for severe carditis in childhood pointed to its slight toxic effects and definite action in rheumatism. For these reasons I selected this compound, but had the greatest difficulty in getting it, and more than once failed to obtain it at all, so I bring before you no exhaustive study.

Illustrative Examples.

The following are examples of patients not treated with salicylates, but with this drug. I have treated 11 cases of great severity.

Case 1.—Female, aged 10. Enucleation of tonsils had been done at 5 years. Fourteen days before her admission to hospital, vomiting and pains in the chest and abdomen developed. There were mitral disease, dilatation of the heart, pericarditis, and massive collapse of the left lower lobe. Streptococci were isolated from the blood by Dr. D. Nabarro and endocarditis produced experimentally with the culture by Prof. Wright at University College Hospital School. Excellent recovery. Salicylates were never used, but "tolysin" was given. Seen two years later, when at school, she was leading a normal life with stable heart and mitral systolic murmur.

Case 2.—Male, aged 8. Had rheumatic fever at 6 and 7 years; the heart was damaged as a result. Fourteen days' history of generalised pains. Admitted with acute dilatation, pericarditis, and left pleural effusion. Treated throughout with 'tolysin." Good recovery after extreme illness.

Case 3.—Male, aged 4½. Admitted to hospital May 16th, 1927. Extremely anæmic, with numerous large nodules and profuse sweating. There was severe arthritis, causing some contraction of both knee-joints, great cardiac dilatation, general pericarditis and mitral endocarditis, massive collapse of the left lung, and chorea. The mental state was one of extreme nervousness, and later of actual disturbance of mentality. It is almost impossible to conceive a more severe case of virulent rheumatism in a child so young. Treated throughout with tolysin and most skilfully nursed, this child is now at the country branch at Tadworth. The nodules have mostly disappeared, and though he is still short of breath the pericarditis has cleared up. The heart extends one finger's breadth to the right of the sternum and one finger's breadth to the left of the left nipple line. There is a mitral systolic murmur at the apex. He is gaining weight and strength. It is my belief that this child would have certainly died if any attempt to push salicylate of soda as a specific remedy had been attempted.

Emergencies in Pericarditis.

Occasionally a large pericardial effusion does occur in a child under 12, and the fluid may push forward the intercostal spaces and give all the other classical signs. Ought we to aspirate, or, bearing in mind the fibrino-plastic character of the exudation, should we open and drain the pericardium? I have seen both methods used and each seems to me to have its place. If the exudation is very rapid and copious, the pressure great, and the patient very ill, it has been my experience that the exudation is more fluid than usual and that paracentesis will be sufficient to tide over the crisis. In other and more gradual cases, incision of the pericardium is preferable, as it enables the more fibrino-plastic exudate to escape. The operation which has seemed to me best is the abdominal route with removal of the xiphisternum.

I have seen this operation done in an earlier stage, when there is little exudation, with the idea of getting rid of a toxic fluid. My view of the pathology of the pericarditis as commencing in the subendothelial tissue does not make me optimistic about the results of this measure, and the operation, not in itself serious, is a formidable one for a child with carditis. The results have not impressed me, and in any case we should need to follow up such a step with some specific serum or vaccine.

Grave difficulties arise if, by mistaken diagnosis, a dilated heart with an adherent and thickened pericardium is explored, whether by paracentesis or incision. Only a surgeon who has had the misfortune to undertake such a case can realise how impossible it is to know where to stop. In one case the heart cavities were explored in three places and the child, curiously enough, improved greatly, but this is exceptional, and it is no light thing to puncture a cardiac wall much damaged by myocarditis.

I have never advised Braner's operation for stripping the pericardium in a rheumatic case, though good results have been reported. The first published operation of this kind in this country was done for me by Mr. Wilfrid Trotter, but the condition proved to be tuberculous. There was wonderful improvement, but death occurred four years later from tuberculous pleurisy. Another equally remarkable operation was done by Mr. George Waugh on a young man who was seen by Sir William Willcox and myself; this was a case of recently adherent pericardium due to a chronic septic infection. The result again was remarkably good, although the patient was apparently in extremis. The rheumatic children I have had under my care have been either too feeble or had too severe valvular disease to permit me to feel justified in risking operation.

Convalescent Stage.

It must be apparent that for the treatment of heart disease sufficient time must be given for the heart muscle to recover tone and for the nervous system to be strengthened by country air and quiet. Gentle education of the mind proves also a great assistance. We have a most treacherous disease to handle and delicate children to treat, and for these reasons no ordinary convalescent home can answer the purpose.

It is some 15 years since I brought forward reasons for special convalescence before the Association of School Medical Officers, and in "School Hygiene" for August, 1912, I ventured to write: "In years to come I believe medical supervision of school children, combined with the efforts of medical officers of health, both supported by the skill and care of general hospitals and assisted by special convalescent homes, will be the means of prevention of much chronic heart disease," and the pioneer efforts of the Invalid Children's Aid Association deserve a special mention.

To-day there is a general recognition of the need for special convalescent methods. Such a step means a considerable outlay of money, and those who provide this have the right to know whether there is a good return, in the relief of suffering and greater possibilities for a useful life in the future, where previously the State lost good citizens and the skill, care, and money spent on the illness in the city hospital were often frittered away. The real object of the special convalescent hospital is to give a child the necessary time to recover as thoroughly as possible from a carditis. I have never thought or suggested that it is a new method for the cure of rheumatism, but it is a means of correcting a serious fault in our therapeutics, a result of the necessity for keeping the beds in the parent hospitals free for acute cases. In

addition, it is possible in such hospitals to add much to our knowledge of the life-history of rheumatism and rheumatic heart disease. It would, however, be dangerous to send severe acute carditis to such an institution. Children who are already hopelessly damaged by the scars of former rheumatic attacks, who have an adherent pericardium and grave valvular lesions and can only exist as complete invalids, are not going to be so much benefited by this treatment as to make their occupation of the beds economically sound.

I would, however, lay down no hard-and-fast lines upon these questions, for circumstances differ in various localities. Again, I would have no hard-and-fast time-limit for the stay of a child in hospital, but, choosing an enthusiastic and sagacious medical officer as the head of the institution and supporting him with a capable nursing staff, I would then leave it to him to decide the question.

Acute and passing dilatations of the heart will have time to recover from the immediate damage and also to regain tone. The slight mitral lesion and the early aortic and mitral lesions will have time to compensate thoroughly. A severe acute carditis will be given the prolonged rest and graded exercise which are indispensable. On the scientific side there is much to be learnt about the recovery of a damaged heart, not only from the study of the heart, but from a study of the child. We all recognise persistent fever in the rheumatic child, and at the back of our minds we suspect some activity in the cardiac lesions or some absorption of infection from a local focus. In these hospitals we shall eventually learn more about this question; we may find, for instance, a vaccine that will be helpful or that in some patients the fever is not an indication for continual rest. Light will be thrown upon the degree of recovery possible in heart disease. I do not mean the mere estimation of exercise tolerance, but the ability to lead a normal life. In these hospitals, if anywhere, we shall learn more of the history of mitral stenosis and of atmospheric influences. There is some difference of opinion on the question of the admission of chorea in the recovering phase. I think that these cases are most suitable when they can be accommodated, but we must be patient until doctors and nurses are convinced that chorea is a rheumatic and not solely a nervous complaint. In some of the hospitals, also, it is to be hoped that there will be opportunities for skilled cardiologists to carry out strictly scientific researches.

It is my hope, too, that one day in this great city there will be a centre for research and the coördination of research on the whole problem of rheumatism, a centre from which indications for lines of advance will be forthcoming and from which trained workers will be sent to the various clinical institutions where cardiac cases are congregated. The great prevalence of rheumatism would make such a step justifiable as soon as this country is able to recover from its financial stress. In no other way can we avoid a great waste of time and energy from scattered and incoördinate attempts at solving the many problems involved.

It will be advantageous if girls can be admitted for convalescence up to the age of 14, for then we may be able to learn more about the nervous disturbances that occur at that age, and their influence upon those difficult cases of myocardial weakness that sometimes result from acute rheumatism without valvular lesions. If disturbances of the thyroid and other endocrine organs take a part in the rheumatic infection or produce unusual disturbances in the rheumatic patient, it is in these institutions that their effects can best be studied. In particular, we need to know more certainly the real necessity, in disturbances of the cardiac action, for a progressive or more cautious line of treatment. These are some of the special advantages that I believe will accrue from this method of supervising the child who is convalescing from rheumatic heart disease.

There will naturally be difficulties. The choice of suitable cases must of course depend at first upon the accommodation available. While beds are scarce, we must use them for cases of early heart disease in which we have every hope of obtaining good and lasting results. This is not a simple problem, for a physician at a parent hospital may have under his care a child with active rheumatism and acute dilatation of the heart, which disappear as the case runs a favourable course. When the child is transferred it is not easy for the physician in the country annexe to realise that there has been any trouble at all. Yet this is the very case in which cautious progressive training of the heart is most important. It will therefore be very needful for the report from the private doctor or the parent hospital to set out clearly the facts of the active phase of the cardiac weakness. In all cases, indeed, the activity of the rheumatic attack before admission to the country annexe must be the chief point.

The certificates that have to be filled up for admission to such an institution need some thought. The questionaire can easily be made too long and tiresome, the certificate fail to get filled up, and the child lose its chance. The problem of the rheumatic child affords a splendid opportunity for the great sections of the medical profession, the general practitioner, the hospital physician, and the officials of the Ministry of Health, to draw closer to one another. The official can give way a little to the other branches of the profession and make his certificate as short and yet to the point as is consistent with safety, and in return the others can make it a duty to see to the signing of the certificate. The result will be that the sick child will have its chance.

I think we must be very careful in collecting evidence upon what are to be called hopeless and therefore unsuitable cases. Let me give two examples.

A little girl of 5 had a severe attack of general pericarditis with mitral disease, and was desperately ill, suffering from repeated attacks of anginal pains which threatened immediate death. Her condition seemed hopeless and her home surroundings were most unsuitable. As a last hope, and I admit with a very uneasy conscience, I obtained her admission to the Heart Home at Kurandai. My colleagues were extremely forbearing to me and kept the child—entirely against their own judgment, I felt—until she was foolishly removed by the parents when much improved. A year after the illness she came back to me with an obviously adherent pericardium and a heart which one could not expect to make a good recovery. The child was, however, marvellously better, had no anginal attacks, and was living a happy life under invalid conditions. If such a hopeless case can do as well as this—and it was for me a test case—I am sure we must be most careful, as accommodation increases, before we condemn any child's heart as incapable of useful recovery, still more of recovery sufficient to make a short existence bearable.

The other case, treated at home by good parents, had been under my care first with severe aortic and mitral disease, then later with what seemed must be a fatal pericarditis. This boy lived to be 21 years of age and did four years' steady work as a clerk without any breakdown until the dreadful and mysterious malignant type of endocarditis developed and proved rapidly fatal.

I cannot, however, pretend to believe that treatment in the best convalescent hospital will prevent children from having further attacks if they return to surroundings likely to produce them. As our knowledge increases, we shall learn to restore these children to the best health possible, and many will probably resist further infection. We shall not, however, succeed with them all until we know the whole history of causation; should this prove to depend upon some atmospheric conditions we cannot control, or surroundings which we cannot alter, there must remain a certain percentage of relapses. Here comes in the great need for improvement in our medical treatment by medicine, vaccine, serum, or other methods yet to be discovered.

Some Records from Kurandai.

I am very much indebted to my friend and colleague, Dr. B. E. Schlesinger, who is acting physician to the Heart Home of the I.C.A.A., at West Wickham, for an analysis of the results from the previous

Heart Home at Kurandai. This home was a pioneer effort in this country at open-air treatment, and was carried out under considerable difficulties.

Three hundred and ten children, varying in age from 3 to 14 years, were treated from 1924 to 1926. The duration of stay was from three to 12 months. All were rheumatic children; many had suffered from previous attacks. Three had severe relapses. One, with arthritis, tonsillitis, and pericarditis, was discharged improved; two, with tonsillitis, pneumonia, and pericarditis, died immediately after removal from Kurandai. There were two cases, both severe on admission, who had slight relapses with passing pericarditis. Eleven cases had some recurrence of arthritis, and all recovered. Five cases developed chorea, four of them having suffered from previous attacks. These relapses occurred most frequently in the winter months. Later histories were obtained in 153 cases, but the period of time between 1924, when the Home was opened, and December, 1927, when this analysis was made, is too short for the observations to be of outstanding value. Ninety-three were reported to be "well," 31 to be in "fair health," 3 to be "ill," and 10 to have died (including the two cases which have been already mentioned). Sixty-four were at an elementary school, 35 at physically defective schools, and 22 were at work.

The history of relapses after leaving the Home is not so satisfactory, but I would once more emphasise that the question of relapse in the home surroundings is another problem which requires special investigation.

Ninety-seven of the 153 had not relapsed, and 56 reported as follows: 10 relapsed with chorea, 13 with arthritis, 2 with "heart attacks," and in 31 the nature of the relapse was not definitely stated. It is interesting that 46 out of these 56 cases relapsed in the first year after leaving the Home. The cases admitted during these years varied widely: 122 had mitral regurgitation, 76 had mitral stenosis, 30 had disease of the aortic and mitral valves, 8 had aortic regurgitation, 37 were examples of simple dilatation, and 4 of recent pericarditis; 23 were cases of uncomplicated chorea, and 10 of uncomplicated arthritis.

I believe that children with rheumatic heart disease gain by convalescence in an open-air country institution where they can also receive education; if this is correct we are making a step forward in the treatment of heart disease in the early phase of its evolution.

Dr. A. P. Thomson has most kindly given me his latest analysis from the Baskerville Residential School at Birmingham of the first 100 children that passed through the institution. He traced 83, and some of these have been repeatedly examined over a period of four years from the time of leaving; 27, who had signs of permanent cardiac damage on admission to Baskerville, had either improved or held their own; 24, admitted with the diagnosis of carditis, were found later to have normal hearts; 12, who had no signs of carditis at Baskerville, had never developed them; 9 had deteriorated; and 11 had died.

Since these lectures were completed, Dr. Coombs has kindly sent me his latest impression of these results; he also supports my views on the promises of special convalescent treatment. Lastly, I should do a grave injustice if I did not refer with great admiration to the pioneer work of the American Heart Association.

Limitations of Complete Rest.

It is difficult to decide the time for which a child should be kept at complete rest after an attack of rheumatic morbus cordis. Opinions differ because children differ, but my general impression is that the value of complete rest, so valuable in active heart disease, can be overestimated in convalescence. A child's heart gains very little—in fact, I think it loses—by prolonged, aimless rest in bed, and certainly the general tone of the child suffers. Graded exercise acts as a tonic to a child's heart. We have to judge when the stage for its employment is reached by observation of each individual case. We have to look to the general condition of the child. Is he gaining weight, cheerful, and fretting for movement? Has the pulse steadied, the impulse of the heart become firm, the area of cardiac dullness become constant? Has the temperature settled and the active signs of rheumatism disappeared? The heart of a child is not so frail that it will suddenly collapse, even if we do advance one stage a little prematurely, provided we keep a close watch. What happens is that the child becomes tired and pale, and the heart may be quickened when at rest and may possibly even dilate a little, or the temperature rise slightly in the evening. This set-back happens more rarely if we can start with skilful massage of the limbs. If a murmur becomes louder, the heart is probably reacting well. The young heart has remarkable vitality. In my cricketing days one of my friends, a double Blue, a County cricketer, and a brilliant fielder and hard-hitter, had, I discovered later, won all his successes in spite of a combined aortic and mitral lesion dating from acute rheumatism in childhood. I do not advocate this method of treatment, but if such a heart can stand the strain of first-class athletics and in the end only succumb to a malignant endocarditis at middle age, we cannot go far wrong in cautiously replacing complete rest with graded exercise for the many children who are kept moping and unnerved for months because they have had a definite but mild carditis.

For over 20 years I have made attempts to treat rheumatic heart disease by sera and vaccines. Messrs. Burroughs and Wellcome made the first serum for me when Dr. Vernon Shaw was working at the subject, and later I tried various antistreptococcal sera, but I never succeeded in obtaining results which justified any clear statement. My experience of vaccines in malignant endocarditis has been one uniform record of complete failure in both child and adult, used early or late, in combination with sera or separately, autogenous or stock, simple or complex, given by the expert or by myself. Not one case has recovered. If acute rheumatism be streptococcal, I consider that the vaccine I now use, prepared by Dr. D. Nabarro from eight strains of streptococci obtained from ante-mortem and post-mortem cases of rheumatic carditis, is rational. I am using it for subacute cases with persistent mild fever, and believe it to be worth a trial. The dosage is a safe one, and is as follows:—50 millions, 100, 250, 500, 750, 1000, 1500, 2000 millions, twice weekly at first, and once a week when the largest doses are reached. The vaccine is sensitised by Besredka's method.

THE BORDERLANDS OF FEEBLE-MINDEDNESS.*

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It is a characteristic of all social problems that they have no sharply defined frontiers. They are all so intimately related that we cannot view any one problem as an isolated entity, any more than we can picture any nation in a position of "splendid isolation." For instance, the problems of housing and rents cannot be considered without reference to the earning capacity and industrial efficiency of the workers who dwell in them. These questions in turn depend upon the character of the employment, the current rate of wage associated therewith and, above all, upon the mental equipment and physical fitness of the individual worker. But in no social problem is this interdependence more striking than in the great question of mental welfare. In England there has been too great a tendency to study it apart from its cognate problems. This tendency is the natural result of the historical development of our interests and of our attitude to the problem under changing social conditions, which until recently have centred attention too closely upon the educational aspects of feeblemindedness, forgetful of the fact that feeblemindedness is but one facet of the many-sided problem of youth and adolescence. On the Continent

* A paper read at the Conference of the Scottish Association for Mental Welfare at Edinburgh.

there has been less confusion of thought and, I think, a wider grasp of the issues involved, with the result that the subject of mental deficiency has been there regarded more from what one may term the eschatological point of view, by which I mean that which estimates the future character-development of each child and the possibilities of his becoming a satisfactory citizen, adjusted to the demands made upon him by the community in which he lives and capable of that ordered and regulated conduct and self-control which is the essence of citizenship. The child with a psychopathic inheritance, the neuropathic child, the neglected or ill-treated child, and the child who is the victim of mental conflicts which result from maladjustments at home, all form an integral part of this problem. It must ever be kept in mind that the outlook on life engendered by adverse circumstances such as these, and the defects in character which so frequently result therefrom, are at least as important as that reduction in general intellectual capacity which is labelled "feeble-mindedness." In attempting to widen our horizon, however, we meet the initial question: Are we to regard mental deficiency (from idiocy to intellectual retardation) as a unitary condition in which the effect follows a given cause, just as the congeries of symptoms which we call "enteric fever," follows infection by the specific Eberth's bacillus? Is it not more probable that under this general term we are grouping a number of conditions, ætiologically distinct, but manifested by the same general type of mental phenomena and conduct which are the direct outcome of mental processes? An analogy will perhaps explain my meaning. Until comparatively recent years all kinds of infections which were characterised by a continuous rise of temperature were grouped together under the term "continued fever," but with the increased knowledge of causation afforded by bacteriology these are now differentiated into distinct morbid conditions.

Two Categories of Mental Deficiency.

We can, I believe, distinguish two main divisions of mental defect; these may be termed "evolutive" and "devolutive." In the former the evolutionary processes have been retarded, and the individual, and usually also the stock from which he springs, has not reached that level of mental development which is demanded by our educational and social systems. In the latter group some intercurrent factors have come into play tending to the destruction of the stock in which they appear. To these factors, such as failure of, or lack of, balance between the activities of the ductless glands, I have applied the term "phthersigenic."[1] The types belonging to this devolutive category frequently show "stigmata of degeneration," whereas the evolutive types in no way differ in appearance from their normal fellows. In the evolutive group there is a reduction in the specific educational capacities, such as those for the acquisition of arithmetic, or of reading, rather than a reduction in the general intelligence. There is abundant proof that general intelligence is distributed in any community along a "normal curve of frequency" similar to the distribution of height, whereas these specific capacities show a markedly irregular distribution. This difference in the distribution of the two factors which go to form general intellectual capacity is a clear indication of the truth of the "Two Factor" theory of intellectual capacity formulated by De Sanctis and Spearman. In the evolutive group the specific capacities remain "larval," and though in this age of commerce and literary education the individuals who belong to it find themselves handicapped in the struggle to maintain themselves, yet they perform a necessary, though it may be humble, service to the community as "hewers of wood and drawers of water." In fact, the presence of such persons to do the drudgery and menial work in a complex civilisation is one of the safeguards of society as at present constituted.

If we take as our criterion capacity to conform to the standards and inhibitions of the community, the menace to society of individuals who show temperamental or character defects is far greater than that of the so-called feeble-minded. The original meaning of the word "character" was the impress of the die upon the plastic material of a seal or coin. It is of the greatest importance that we should keep in mind this twofold implication of the term—i.e., the innate plasticity or receptivity of the mental make-up and the forces and influences which are brought to bear upon it, by which it is shaped and moulded. Remembering this we realise how misleading is the antithesis "Nature *versus* Nurture," for the implied antagonism cannot exist, nor is it possible to calculate the relative values of each component. Heredity and environment form the warp and woof of the texture of personality.

Exogenous and Endogenous Factors.

The same facts can be expressed in another way. The material or bodily components of the mind of every individual share with the rest of the body the debts which each of us owes to the generations which have preceded us, the physical capabilities and weaknesses which are handed on from parents to offspring according to the so-called "laws of heredity." These are thus fundamentally biological factors and as they are inherent in us they may be termed endogenous. On the other hand, as Aristotle [2] points out again and again, man is by nature a social animal, and from the earliest days of his life suggestions of social import pour in upon him and with a pressure which increases year by year mould him to the pattern demanded by the community of which he is a member. Thus his conduct, which is the expression of his degree of adjustment to his social environment, is the impression of the design which has been cut upon the die. These factors are exogenous. "Character," therefore, implies a degree of permanence and stability of conduct, and the lack of these qualities constitutes in the main what is popularly termed a "weak character." But in the light of recent developments in psychology we are led to regard as the mainspring of conduct not the intellectual qualities of reason and judgment, but the emotions, and have come to associate the manifestations of the emotions with the activities of the endocrine glands. But since the regulation of bodily growth is also a function of these organs, a definite relationship has been established between the bodily and mental functioning. This is the explanation of the frequent presence of "stigmata of degeneration" in individuals belonging to the "devolutive" category.

Continental observers, for example, describe two distinct physical types as associated with markedly anti-social proclivities—i.e., the "Kobold type" amongst boys and the "Steatic type" amongst girls. The latter type is said to be found chiefly amongst prostitutes and women of the most degraded class. With a marked tendency to fatness, a coarse, greasy skin and thick tousled hair, is associated an incurable indolence and inability for any form of sustained work. The "Kobold," so called from his fancied resemblance to the gnomes or goblins of our fairy stories and myths, is a short, thick-set muscular individual with a large thick-boned skull balanced by a powerful jaw. (See figure.) Prof. Lazar, of the Psychological Clinic attached to the Children's Court in Vienna, told me in conversation that all of the five boy-murderers whom he had examined belonged to this type. The following is a good example of this Kobold type:—

CASE 1.—Boy, born April 4th, 1917, and first examined Oct. 18th, 1926.

Family History.—A bigamous marriage; father imprisoned and on release absconded to Australia. Mother a careful intelligent woman, anxious to do her maternal duties.

[1] Æschylus: Septem contra Thebas, line 1054.
ὦ μεγάλαυχοι καὶ φθερσιγενεῖς
Κῆρες Ερινύες.

[2] Aristotle: Nicomach. Ethics 1, VII. 6, also Politics 1253 a2. See also Seneca, De Beneficiis, vii., i., 8.

School Report.—Was in Board of Guardians' Cottage Homes for several years. For past year has been stealing regularly and frequently, chiefly apples, bottles of sauce, sausages, jam, &c. Headmaster reports, "intelligent boy, above the average of his class." Untruthful and cruel but willing to help in the house-work.

On March 16th, 1928, he was charged with persistent wandering into railway trains. On March 1st he took a small sister at 10 P.M. to the station, where they secreted themselves in a train which he said was labelled "Crewe." On reaching Crewe they got out, seeing another labelled "Glasgow," got into it. Ultimately they found their way to Stockport. Three days later he took his sister by a local train for a 25-mile journey. On March 10th he again found his way to the station at 10 P.M. and, seeing a train to York, got into it, but was found at Burton-on-Trent. He gave the following account of his escapade:—

Child of the Kobold type.

"I played in the street after I had scrubbed the floors until it got dark, and then went to the station. I got in a train; it was going to York. I wanted to go in a ship on the River Humber. I've seen (pictures of) people going on to the ship. I thought the ship would go down the Humber, round Scotland, and then past Ireland and over the 'Lantic Ocean' to Canada. New York is by North America. I thought I'd see some Red Indians and go with them in a tent; I'd work for them and scrub the floors. There's a lot of fruit. I'd live with the Indians because they're kind. The porter took me to a little office and they gave me some bread and cheese and put me in another train in the guard's van. I looked through the window and saw the fields and a fair and an aerodrome." (This is quite correct.)

He reads with ready facility and with the same tendency to fantasy building. Calculates quickly, and at once gave the correct change from half-a-crown after buying four loaves at 4½*d.* each. Physically he is short, thick-set, with large head and jaws, and no evidence of disease.

Physical and Mental Correlation.

Kretschmer[3] and others have noted that when a mental break-down occurs, the form of insanity which results is largely conditioned by the bodily configuration of the individual; that there is, in fact, a biological affinity between the bodily and the mental make-up. Bearing in mind this biological affinity and also the hereditary transmission of physical or endogenous characters, we are prepared for the discovery of a strong familial association of certain types of mental abnormality, including the various forms of insanity, mental deficiency and those neurasthenic manifestations which are grouped together under the inclusive term "neurotic temperament." This intimate relationship between types of bodily conformation and mental traits and dispositions is of course recognised in our experience of every-day life. Don Quixote, the lean and lanky idealist, is the opposite of Sancho Panza, the jovial exponent of animal spirits. In fact, amongst German writers the "Sancho typus" and the "Quixote typus" are used to designate opposite poles of combination of bodily and mental characteristics. From the social point of view these cases are much more important than pronounced cases of mental defect. From an administrative point of view they form a far more difficult and intricate problem, for they cannot be brought within the ambit either of the Lunacy or of the Mental Deficiency Acts. They belong to the borderlands of feeblemindedness. Yet even the most ardent of eugenists would scarcely at present propose that a mental break-down should entail segregation or sterilisation, and that marriage and parentage should be for ever prohibited. Yet such stocks may supply examples of every kind of anti-social behaviour. In the Minutes of Evidence presented to the Royal Commission on the Care and Control of the Feebleminded[4] is a genealogical tree which gives a vivid illustration of the burden which the community has to bear from stocks which carry this neurotic temperament. Here is another example:—

Some years ago, in the course of examining a boy of 11 who had been absent from school for two years with severe chorea, I was struck by the mental inertness of his mother. She was a highly neurotic, garrulous woman, who complained that "her nerves had affected her memory." She had received a better education than might have been expected from her social status. Two of her sisters had been insane. Two of her children had died in infancy; her other older son was normal but suffered from chronic ear-disease. Her two remaining daughters, aged 18 and 16, already showed marked mental instability. Her late husband, who was said to go "violent mad when drunk," had attacked her with a razor, and the question of his certification as a lunatic had been raised before his death from typhoid at the age of 48. He was the father of an illegitimate child. Of her husband's family one sister was insane before marriage, had had an illegitimate child, and was very violent-tempered. The first husband of this sister had been hanged for murder, and her second husband, whom she had attacked with an axe, had left her owing to her violence. Her daughter from her first husband had been certified insane. Another sister was a chronic alcoholic with one illegitimate child. A brother was described as "most violent," who "threw the crockery about." Another brother was described as "highly strung, most irritable."

This family history affords a good example of the various manifestations of mental instability and of the social havoc which degenerate stock may wreak in a community. It is indeed probable that the severe chorea in my patient was but part and parcel of the same genetic instability.

CASE 2.—A girl, aged 9, was examined on March 3rd, 1928.

Family History.—The father, who was discharged from the army as mentally unfit, states that while serving in North Russia "they reckoned I went mad in the firing line. I went properly mad. I jumped over the barbed wire and started firing, I don't remember much about it." He was placed in an asylum, and later had a second attack and was again in the asylum for four months. Is a quiet-mannered, debilitated man who earns his living by cutting firewood.

Present Condition.—A bright and engaging little girl who for the past two months has been a persistent thief from home and school, but her parents had noticed a tendency to pilfer for some time. She spends part of the money on herself and gives part of it away to other children. She shows a marked deftness and method in her pilfering, and no idea of remorse in robbing her father of the money he had saved to buy his wood. "I took 10*s.* from upstairs—mother was keeping it for my coat." "The teacher's bag was hanging on the pipes, I took 18*s.* I went with another girl to Woolworth's. We bought some sweets, a powder-puff and face cream, and some fancy garters. I've some long stockings at home. We went on the bus. We went to the coffee house and bought a boiled egg and bread-and-butter. We often go to the pictures. Dad gives us the money."

The girl showed no evidence of physical or mental defect except much fidgetiness, and was quite up to the average intelligence and education for her age.

CASE 3.—Boy, born on Sept. 27, 1910. Left school from Standard VII.

Headmaster's Report.—"Mental capacity fairly good, takes an interest in games; of fairly even temperament. Possesses considerable capability."

At the age of 10 he was sent to an Industrial School, having been charged with stealing £15 and a bicycle pump. While in the school his general conduct was good and no signs of

[3] Kretschmer: Korperbau und Charakter, Berlin, 1921.

[4] Royal Commission, vol. i., pp. 611, 612.

mental abnormality were noticed. On being licensed out to a farm, in 1926, he set fire to the stacks of his employer. He states that he had been happy and well-treated at the farm. "I went to the pictures. I saw a ship on fire, and when I was coming across the field I was thinking of lighting a fire. When I came back I went to the farm and lit six or seven hayricks. I went to bed and got a drink of water. I was frightened because I knew I should get into trouble. I've never done it before. The idea came to me when I was coming across the fields and I felt I'd like to do it. I thought they'd blame someone else. I didn't want to damage the master. I weren't thinking when I was lighting it. I was sorry afterwards."

Mental Examination.—Memory span of six figures. Understood the use and object of postage stamps. Calculated the change from 2*s.* 6*d.*, on buying four loaves at 4½*d.* each, quickly, and gave the number of halfpence in 7*s.* 6*d.* For three-word combination sentence gave "London's like a money (many) flowing river." Failed in detection of a fallacy, gave fair list of differences between wood and glass. Did Healy's Form Board B correctly. No physical disease.

Family History.—Mother has been in a lunatic asylum on three different occasions, is now at home, but is reported to be again in need of certification. Though the examination showed that he could not be certified under the Mental Deficiency Act, it is of course quite possible to argue that his actions are the preliminary signs of mental degeneration, though his subsequent history gives no indication at present of any such degeneration. He is now in regular employment.

It is clear from the family antecedents of these illustrative cases that when they reach adult life they are likely to constitute a menace to the well-being of the community unless the force of social suggestion acts with sufficient power to mould the character with the impress of social obligation. But the problem which presents the most acute difficulty is that of dealing with the numerous children who, as the result of an attack of encephalitis lethargica, show the strange perversions of character which manifest themselves in anti-social conduct. These children become addicted to persistent thieving, lying, and sex-delinquencies and are the bane of the home in which they live. Not a few of them find themselves in the Children's Courts, and some are convicted to industrial schools, reformatories, and prisons. Yet few show a deterioration of intellectual capacity sufficient to bring them within the Elementary Education (Defective and Epileptic Children) Acts or the Mental Deficiency Acts, and the majority remain free to pursue their own course of wayward and unruly conduct. The few who are to be seen in mental hospitals differ in no way from the rest of their fellow sufferers.

Austrian Methods.

But how is this impress of social obligation to be made if we narrow the scope of our efforts by the limitations imposed by the Mental Deficiency and Lunacy Acts? Herein I think we may learn much from the methods in Austria, where the problem is viewed from a wider standpoint without the departmentalisation which has grown up in England. There the basis of classification is in the main a psychological examination. There may be a tendency to rely too completely upon conformity to certain preconceived psychological types, but I think there is no doubt that such an examination and classification yields more valuable results, from the point of view of the capacity for future citizenship, than those which accrue from a determination of the mental age and intelligence quotient, useful as these may be. For example, at the Great Colony of Egginburg, some 50 miles from Vienna, there are about 900 male and female inmates of ages ranging from 6 to 25 who, on the results of a careful psychological examination, are housed in pavilions containing 25 beds under a supervisor. The inmates of the male section meet in common in the workshops, extensive gardens, farms and orchards and, where possible, boys from the country districts are employed in occupations which are likely to interest them and to be of value to them in after-life—e.g., gardening, farming, fruit-growing, carpentering—while the town-dwellers are taught the more mechanical trades which will serve them in good stead when they return to their homes in the towns—e.g., tailoring, weaving, shoemaking, baking, building, &c. This division, according to their individual interests, in itself tends to reduce mental conflict and to arouse an increased interest and contentment.

The groups into which the inmates are divided are: (1) Those suffering from simple neglect without character defects. (2) Those who have suffered from neglect or ill-treatment and exhibit true character defects and conflicts at home, showing a tendency to gang-formation. (3) Those who show slight neuropathic tendencies. (4) Those who show severe neuropathic conditions, but with good intelligence—the "difficult child" type. (5) Those who suffer from psychopathic defects, but without instability of character; mental conflicts. (6) The aggressive or Apache type, often with reduced general intelligence. (7) Those with severe psychopathic defects, epilepsy, early dementia præcox cases. (8) The feeble-minded.

It is only when one sees a mass parade of all the inmates divided into groups that one realises the practical validity of this method of classification.

A very similar classification system is carried out at other institutions which I have visited in Vienna, as for example at the Schutzheim for difficult boys managed by Dr. Kehrein under the auspices of the *Sodalitas Salesiana.*

It must not, however, be inferred that no psychological classification is used in England, but the point upon which I wish to lay emphasis is that here each group would be treated, if at all, in a separate institution and generally under separate authorities, both central and local—e.g., the local Education Authority under the Board of Education; the Poor Law Guardians under the Ministry of Health; Industrial and Reformitory Schools under the Home Office; the Mental Deficiency Committee under the Board of Control; and voluntary organisations. Yet each group represents one aspect of the great protean problem of childhood and adolescence and most of them belong to the borderlands of feeblemindedness, each being symptomatic of a difficulty in adjustment to the environment and the realities of life. We cannot too often remind ourselves of the saying of the Roman philosopher, Seneca,[5] *non scholæ sed vitæ discimus*, for the purpose of our educational efforts is not the mere inculcation of knowledge, but to aid each individual to play his part, however humble that part may be, in the community of which he is a member; to give, in fact, in the words of Plato,[6] "that education in virtue from youth upwards, which makes a man eagerly pursue the ideal perfection of citizenship and teaches him how rightly to rule and how to obey."

Upon the standpoint from which we survey the problem will depend not only the scope of our endeavours but the means which we shall employ. The wider our view the better able shall we be to envisage the problem of mental maladjustments as a whole, unfettered by any artificial sub-division of the individuals whom we hope to benefit by our efforts, and the greater will be the advantage to the community which we serve.

[5] Seneca: Epist. 106, §12. [6] Plato: Laws, i., 643.

LOTTERIES FOR BOMBAY HOSPITALS.—It was recently proposed to the Corporation of Bombay that money for the maintenance of the local hospitals should be raised by means of lotteries. The plea was supported by the argument that the public of Bombay are already supporting hospitals and charitable institutions in Goa through the Goa lotteries, of which there is one every fortnight, and it was calculated that from 20 to 25 lakhs of rupees could be raised in this way. The Medical Relief Committee of the Corporation referred the matter to the Municipal Commissioner, who pointed out that such lotteries would require the sanction of the Presidency Government, which was very unlikely to be given to an organised series. The proposal has therefore not been entertained.

BLOOD TRANSFUSION IN BLACKWATER FEVER.

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THERE is no disease in which the prognosis is so uncertain as blackwater fever, whether treated in the tropics or in England. From time to time practitioners get a series of favourable cases and are then apt to conclude that the success is due, say, to the administration of some special drug. A subsequent unfavourable series, however, causes them to doubt, and warns them not to boast about their previous results. An experience of 28 years, both abroad and at home, leads me to the conclusion that, apart from careful nursing and attention, there is no specific treatment for this disease. Many drugs have been lauded from time to time, only to fall into disfavour and disuse.

The main causes of death in blackwater fever are (1) syncope, (2) acute hæmolysis, (3) suppression of urine, (4) hyperpyrexia, and (5) asthenia, which produces, perhaps, the most disappointing results. In this type of case the urine clears, yet the patient does not improve, the blood does not regenerate, and gradually a semi-comatose condition supervenes and death takes place. Looking back, one is impressed by our powerlessness to prevent death in such cases. The marrow seems to become exhausted, and no longer capable of producing new blood.

In a recent case of this kind we tried to save life by blood transfusion, and so had the opportunity of seeing its effect in stimulating the marrow to renewed life and the formation of fresh blood corpuscles. We had no hesitation about trying this, even considering the possibility of causing more hæmolysis, because the patient could not have lived through the night.

In a paper on blackwater fever in London,[1] Manson-Bahr and Sayers record a somewhat similar case. They say:—

> "In a recent moribund case in whom the urine had cleared, but who was suffering from extreme anæmia (the blood count showing only 850,000 red cells per c.mm.), blood transfusion of 700 c.cm. of blood was performed, with the result that the patient revived in a miraculous manner and regained consciousness. There was no evidence of any further hæmolysis, and the urine remained clear. Unfortunately the improvement was not maintained and, in spite of a further transfusion, the patient died three days later."

In this case the authors considered the results encouraging and thought it was worthy of another trial if a suitable case occurred.

The Present Case Described.

The history of our case is as follows:—

European, male, aged 50, a planter in British Guiana. Born in England; went to British Guiana about 1896 and has lived there ever since with the exception of holidays in England, the last of which was four years ago.

Previous Illnesses.—Measles; no scarlatina, enteric, or rheumatic fever. Many attacks of malaria during the last 25 years; one attack of dysentery. Had an attack of (?) hæmaturia five years ago (1923), and was in hospital six weeks. No definite diagnosis was made. Came to England after this attack and saw a specialist, who could find no cause for the hæmaturia. X ray examinations were negative.

Present Illness.—In January, 1928, the patient suffered from a series of short attacks (about four in number) of what was called hæmaturia. He did not go to bed, but went on with his work the whole time. The attacks lasted three or four days to a week, with three to ten days' intervals. Patient then sailed for England and at first felt fit and well, but a little later he felt feverish once or twice. On Friday morning, March 23rd, he got a chill while on deck and developed a sharp fever. He passed dark-coloured urine that afternoon, and his temperature was 103° F. that night. The ship arrived at Tilbury on March 26th, 1928, and the patient was immediately brought up to the Hospital for Tropical Diseases and admitted at 1 P.M. A cursory examination at once showed that he was suffering from hæmoglobinuria (blackwater) and not hæmaturia. He was desperately ill, deeply jaundiced, anæmic, with a large spleen and a subnormal temperature, 96·6° F. The pulse was fair. The lungs showed considerable bronchitis, with râles and rhonchi over both bases. A blood count showed the number of red blood corpuscles to be as low as 980,000 per c.mm.; white blood cells, 7000; hæmoglobin, 30 per cent.; differential count: polymorphonuclear leucocytes, 67 per cent.; large mononuclear leucocytes, 7 per cent.; lymphocytes, 26 per cent.; eosinophils, 0. No parasites. Anisocytosis and poikilocytosis, marked. Urine: dark reddish black colour; albumin, ++; many granular casts and debris; no red blood corpuscles; hæmoglobin present.

Treatment was at once commenced with rest, warmth, fluids, nourishment, and alkalies. The foot of the bed was raised; milk diluted with soda water, orange water with glucose, barley-water, and sodium bicarbonate in water were given repeatedly in small amounts by the mouth.

At 11 P.M. on the night of admission, considering the journey from the dock to the hospital, the patient's condition was fair. Since admission at 1 P.M. over 20 oz. of black urine had been passed, which showed evidence of clearing in the later samples. Fluids were being taken well; the pulse was 112, and its volume fair.

At 6.30 A.M. next morning the patient showed signs of collapse. The pulse became almost imperceptible at the wrist, and the breathing irregular and of the Cheyne-Stokes type. The mouth and tongue were very dry and sore. Strychnine gr. 1/30 subcutaneously was followed by intravenous glucose ℥ viii. at 8 A.M. By 10 A.M. a rapid change for the worse set in, with sweating, pain in the chest, rapid and feeble pulse, and respiration-rate 42. The features became pinched, the eyes dull, and a mucus rattle appeared with respiration, the patient being too weak to cough. Strychnine gr. 1/30 was again given, followed by camphor in oil 1 c.cm. an hour later. Some delay (through no fault of the London Blood Transfusion Service, who in this case, as in all previous cases, have never failed to provide volunteer donors to this hospital at short notice) arose in arranging for a blood donor, and during the interval before his arrival the temporary improvement, which had again followed the stimulants given at 3 P.M., passed off. By 6 P.M. signs of rapid dissolution were present: a semi-conscious state, glazing of the eyes, rattle in the throat, and very feeble pulse. We were unanimous that without blood transfusion death was imminent.

The patient's blood had previously been examined and found as follows: red cells, 980,000 per c.mm.; hæmoglobin, 30 per cent.; white cells, 7000; blood-group III.; van den Bergh: direct test negative; indirect test strongly positive—about 22 units. Test for hæmolytic system, as found in cases of paroxysmal hæmoglobinuria, negative. At 7 P.M., after checking the absence of agglutination of the donor's cells by the patient's serum, blood transfusion was started and 400 c.cm. of citrated whole blood was given. During the transfusion a visible improvement took place; the pulse became stronger, the colour less ashy, the tongue less dry, and at the close of the transfusion the patient succeeded in coughing up mucus from his throat. The urine subsequently passed showed no evidence of any further hæmolysis; 44 oz. of black water had been passed in the first 16 hours in hospital, and contained much albumin and some granular casts. Red blood cells were not seen, but hæmoglobin was present. At 10.45 P.M. strychnine was again used to treat a sudden collapse; the very brief improvement was followed at 11.20 P.M. by another period of collapse. Shortly afterwards the bowels moved in response to an oil enema; there was a very distinct improvement, the pulse being better and stronger. As the bowels had been confined for some time and, as was discovered later, hæmorrhoids caused much pain on defæcation, it is probable that the collapse was associated with the bowel movement.

March 28th: The patient had slept for short periods during the night. He maintained the improvement during the day, but had slight incontinence of fæces and urine with pain on micturition. His general condition remained much the same until the afternoon of the 29th, when he became distressed and appeared to have considerable pain over the [illegible] f the right chest, where pleuritic friction was audible.

[1] P. Manson-Bahr and E. G. Sayers: THE LANCET, 1927, i., 273.

The application of antiphlogistine gave relief and the condition appeared to resolve. The urine collected for the two periods of 24 hours was 61 oz. and 47 oz. The blood count showed 1,000,000 red cells and hæmoglobin 30 per cent.

30th: In the morning the breathing became laboured, the pulse quickened, and the patient appeared more drowsy and weaker. He was coughing up large quantities of sputum. As he was obviously sinking, it was decided to transfuse blood again, and at noon 300 c.cm. of citrated whole blood were given. There was an immediate general improvement, which was maintained throughout the afternoon and evening.

31st: Patient had slept a little during the night, in spite of a distressing cough, and was stronger and mentally brighter by the morning. A blood film showed normoblasts for the first time. A blood count on April 1st showed 1,630,000 red cells and still no parasites, and another, next day, showed 2,200,000 red cells.

From April 1st onwards the history was one of slow but steady progress. The amount of urine passed daily varied from 60 to 80 oz., the temperature, which had been swinging between 99·5° F. to 101° F., began to subside, and the cough became less troublesome. Liquor arsenicalis ℥i. t.d.s. was started on April 2nd, and was gradually increased. On the 9th "ring" forms of the parasite of subtertian malaria (*Plasmodium falciparum*) were found for the first time. Quinine hydrochloride gr. i. with iron and arsenic was therefore given three times. On April 10th, tablet plasmochin co., one twice a day, was started, and the iron and arsenic were discontinued. The plasmochin tablets were gradually increased.

Date.	R.B.C. in millions.	Per cent. of Hb.	Treatment.
March 26	Jaundice developing.		Rest; fluids; diluted milk; alkali; glucose
27	9800	30	As above + strychnine gr. 1/30 bis.; camphor in oil once; blood transfusion 400 c.cm.
28	1000	30	As above, without blood transfusion.
29	—	—	As above, with blood transfusion 300 c.cm. + meat extract + jelly + sago.
30	1000	30	Normoblasts seen.
April 1	1600	—	
	Jaundice abating.		
2	2210	40	Liq. arsenicalis ℥i. t.d.s.
5	2800	40	
9	—	—	*P. falciparum* "ring" forms seen. Quinine gr. i. + iron and arsenic t.d.s.
10	—	—	2 daily.
12	3230	70	Full diet + liver. 4 ,,
13	—	—	8 ,,
14	Temperature normal.*		Tab. plasmochin co. 9 ,,
15	—	—	12 ,,
16	—	—	12 ,,
17	—	—	Tab. plasmochin co. discontinued.
18	3700	70	No malarial parasites seen on this date nor in any subsequent examination.
22–25	—	—	Plasmochin co. 12 tab. daily.
26	3900	75	,, discontinued.
27	—	—	Mist. arsenic co. ℥i. t.d.s.
28	—	—	Patient allowed out of bed for first time for half an hour.
May 4–7	—	—	Plasmochin co. 12 tab.
4	4250	80	—
9	—	—	Out for first drive.
10	—	—	Plasmochin co. 3 tab. daily. Tab. iron and arsenic started.
14	4490	80	—
15	—	—	Patient discharged from hospital, with instructions to continue taking quinine hydrochlor. grs. v. twice daily for the next three months.

* From this date onwards.

The maximum dose of plasmochin co. given was 12 tablets per diem; this dosage was reached gradually from an initial dosage of two tablets per diem. The plasmochin was given in short courses of decreasing length—viz., six, four, and four days—and the intervals of rest from plasmochin co. between each course increased—viz., five-eight days in this case.

Blood transfusion is not an entirely new line of treatment in blackwater fever, for Manson-Bahr and Sayers[1] record a case. Nevertheless, the results in our case, considered with the scanty records of other people's work on this line, appear to justify this somewhat lengthy account of our single case.

The clinical condition, combined with the laboratory tests of our patient on his admission on the fourth day of his illness, suggest that as a case he would come into Group II. as described by G. R. Ross.[2] Group II. cases are described as those showing "definite hæmoglobinuria of moderate severity; no suppression; recovery." These cases show Fouchet's test for bile pigments in blood + +. van den Bergh: direct—negative; indirect—5 and 16 units. If placed in this group our patient must have been in the severest attack compatible with inclusion in the group, and were it not for the fact that he was alive, almost untreated, 70 hours from the onset of blackwater, it might be justifiable to place his case in Group III.: "Cases with severe hæmoglobinuria: no suppression; death in 24 to 48 hours." These cases showed Fouchet's test + +: van den Bergh: direct—negative; indirect—6 (first day) to 20 units.

W. Kikuth[3] gives a comprehensive summary of the therapy recorded by various authors in blackwater fever, but no reference to blood transfusion appears.

Actual and Theoretical Effects of Blood Transfusion in Blackwater Fever.

1. It undoubtedly treats anoxæmia symptomatically by helping to replenish the patient's supply of red blood cells.

2. It acts as a stimulus to blood cell formation. There may or may not be an adequate stimulus already provided, but in our case the rise in the number of red cells per cubic millimetre coincided with the time at which blood rejuvenation occurs in other diseases after blood transfusion.

3. The urine in blackwater fever is loaded with albumin. The introduction of healthy blood plasma is probably advantageous.

4. It dilutes the hæmoglobin and the bile pigment already free in the plasma, and so may aid the kidney in its work of excretion.

5. It replenishes blood-volume without unduly increasing the amount of sodium chloride. Baker and Dodds[4] have shown in their work on obstruction of renal tubules during the excretion of hæmoglobin that a percentage of more than about 1 of sodium chloride is a very important factor in causing coagulation of hæmoglobin, and therefore tends to cause suppression of urine. Further, Dr. J. G. Thomson, in conversation with one of us (P. H. M.), has recounted how disappointing and sometimes even disastrous were his results in treating blackwater fever in S. Rhodesia with intravenous salines. This was, of course, before the publication of the work of Baker and Dodds in 1925.[4]

6. It provides the most natural antidote possible to the acidosis and the acid urine which Baker and Dodds have shown in the same paper to be so very important in causing coagulation of the liberated hæmoglobin.

It is noteworthy that in our case, in spite of the alkali treatment which was carried out from the start of hospital treatment, the urine was still acid to litmus on the second day—after nearly 24 hours' treatment.

7. It provides such antibodies as the donor may have in his blood against organisms which are likely to cause intercurrent infection—e.g., lung complications.

8. It does not appear to lead to further hæmolysis, provided the bloods are carefully matched. Auto-agglutination has been observed by us in severe malarial infections, and demands the utmost care to keep the temperature of the ingoing blood and of the receiving limb as near normal as possible.

9. Whether there is any specific therapeutic action against *P. falciparum* is very doubtful.

It should be noted that neither our patient nor the donor had any quinine in his system at the time of the transfusion. M. Ghiron, in his studies on the pathogenesis of blackwater fever[5] has demonstrated in

[1] Ross, G. R.: Brit. Jour. Exp. Path., 1927, viii., 442.
[2] Kikuth, W.: Arch. f. Schiff- und Tropen-Hygiene, 1927, i., 501.
[3] S. L. Baker and E. C. Dodds: Brit. Jour. Exper. Path., 1925, vi., 247.
[4] Arch. f. Schiffs- und Tropen-Hyg., 1927, xxxi., 113.

vitro the marked hæmolytic action of blackwater fever serum on quininised red cells, particularly on those from a malarial patient. Transfusion of blood would therefore appear to be inadvisable at a time when the blood of either donor or recipient contains quinine. Prof. Ghiron's charts suggest that the hæmolytic system disappears from the serum of a blackwater fever patient within a month of the attack.

Conclusions.

In view of the facts brought out by this case, it would seem that transfusion of whole blood at the time of, or immediately after, an attack of blackwater fever, provides us with a new and useful therapeutic measure in the treatment of certain types of this disease, the usual methods of rest, warmth, fluids, and alkalis of course being combined.

Further, our case suggests that the fear of causing more hæmolysis should never be allowed to prevent blood transfusion in desperate cases of blackwater fever, and that even in less severe cases transfusion may be a useful addition to treatment. We feel sure that transfusion should not be delayed until a patient is moribund, but that even at the last minute it is worthy of trial. The exhibition of tablet plasmochin co. several days after the initial hæmoglobinuria caused no further hæmolysis and it was successfully exhibited against the parasites of *P. falciparum* when they reappeared in the peripheral blood.

SOME ASPECTS OF VESICAL TUMOURS

AND THE RESULTS OF TREATMENT.

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This investigation began in an endeavour to ascertain the best form of treatment for papilloma of the bladder, more especially to prevent recurrences, but it soon became evident that other vesical neoplasms would have to be included. The neoplasms to which the bladder is susceptible are classified into simple and malignant, the latter being either locally or generally malignant, according to whether they invade the bladder alone or form metastases in other parts of the body. The most important simple tumour is the papilloma, which may be sessile or pedunculated, varies in size from a small pea to an orange, and possesses long villous processes. Other simple tumours, such as the connective tissue tumours which arise in childhood, adenomata arising in glands at the base, and cholesteatomata, are exceedingly uncommon and none occurred in this series.

The malignant growths which attack the bladder are the malignant papilloma, the carcinoma, and the sarcoma. In the malignant papilloma the villi are more stunted and irregular than in the benign form, the bladder wall becomes infiltrated, and the mucous membrane at the base of the tumour adheres to the submucous tissue. Carcinoma of the bladder may be a sessile nodular growth, irregular in appearance, projecting into the lumen of the bladder, and varying in size from a marble to an orange, or it may be mainly intramural with a few nodules of the surface. Sarcoma is extremely rare and is found only in infancy and late adult life. Only epithelial neoplasms occurred in this series.

The difficulty in diagnosing, in certain cases, between carcinoma and the more malignant forms of papilloma has made it necessary to include all cases of vesical new growth in this investigation. For instance, in some of the cases examined the clinical findings at operation have been those of carcinoma, but on section no pathological evidence of invasion has been found. One of the chief reasons for this is that, in the specimen removed for pathological examination, the base of the tumour has not been cut. On the other hand, tumours which to the naked eye appear to be innocent papillomata have, on pathological investigation, shown evidence of invasion. One of the chief methods of treatment of vesical new growth is diathermic cauterisation, the destruction of the growth being performed through an operating cystoscope. Specimens from these cases are not suitable for pathological investigation, so that the diagnosis rests mainly on the cystoscopic appearances. It would therefore not be justifiable to distinguish definitely between simple and malignant tumours on clinical appearances alone.

Incidence and Course.

Vesical neoplasm is a fairly common and fatal disease. Of 168 cases taken from the records of St. Thomas's Hospital between the years 1914 and 1926 only 59 were known to be alive in the latter year; 57 had died and the remainder were untraced.

The disease is most common between the ages of 50 and 65, but two patients in this series were aged 18, one being male and one female. It is more common in males than females, in the proportion of 3 to 1. The tables show the sex- and age-incidence (Table I.).

Table I.

Age.	Males.	Females.	Total.	Percentage.
Below 20	1	1	2	1·19
20–29	6	1	7	4·17
30–39	9	3	12	7·14
40–49	21	8	29	17·26
50–59	40	12	52	30·95
60–69	37	12	49	29·17
70–80	12	5	17	10·12
Totals	126	42	168	100·00

Of these 168 cases, only 116 could be traced up to 1926 or till death; 11 additional cases were traced for a time and then lost sight of. Up to the end of 1922, 68 cases were treated for vesical new growth. Of these, 59 were traced from the date of their first treatment until 1926 or until death. These cases, therefore, have a minimum possible post-operative lifetime of at least four years, and (as one first received treatment in 1911) a maximum up to 15 years, according to the date on which they first received treatment. The period since 1922 is too short to give a fair idea of the comparative fatality of the disease in cases treated after that year. The following table shows the number of cases treated up to the end of 1922 and the duration of life after the first treatment.

Table II.

Duration of life after operation.	1926. D.	1926. L.	Total.	Duration of life after operation.	1926. D.	1926. L.	Total.
3–6 m. ..	10	—	10	7–8 yrs. ..	3	3	6
6–12 „ ..	1	—	1	8–9 „ ..	1	6	7
1–2 yrs. ..	3	—	3	9–10 „ ..	1	2	3
2–3 „ ..	2	—	2	10–11 „ ..	—	1	1
3–4 „ ..	2	—	2	11–12 „ ..	1	—	1
4–5 „ ..	2	10	12	Over 12 yrs.	—	1	1
5–6 „ ..	2	5	7				
6–7 „ ..	2	1	3	Total ..	30	29	59

D = dead. L = Living. m = months; yrs. = years.

Only about half of these patients, therefore, are still alive, and of the 30 who are dead 20, or 66 per cent., lived less than five years after operation. A large proportion of deaths occur within six months of treatment. The fatality of this disease is just as strikingly shown in 43 traced patients who received treatment between 1922 and 1926. Only 27 of these 43, or 63 per cent., have managed to live four years and many have lived very much less, as some only received treatment in 1925. It must be borne in mind that many of these patients have had several treatments, and of those who were still alive in 1926 many still had symptoms. The two main causes of death from vesical tumours are hæmorrhage and

pyelonephritis. Post-mortem reports were only found of 12 of the cases which died in hospital. The causes of death in these were :—

Hæmorrhage and cystitis	3
Pyelonephritis and cystitis	4
Uræmia	1
Bronchitis and œdema of lungs	1
Extra-peritoneal abscess	1
Secondary growths in viscera	2

A noteworthy feature of vesical new growths, more especially papillomata, is their tendency to local recurrence after complete removal. They may recur in the actual spot from which the original tumour was removed, or elsewhere in the bladder.

There is some evidence, though it is not conclusive, that innocent tumours do at times become malignant, as the following cases show :—

(1) Male, aged 36, a porter, was operated on on Oct. 21st, 1918, a suprapubic excision of a tumour being performed. The growth had all the naked-eye appearances of a villous papilloma, but unfortunately it was not examined microscopically. Four years later, on Dec. 14th, 1922, suprapubic excision was performed again, and the tumour, on pathological examination, was found to be a carcinoma.

(2) Male, aged 44, on whom a suprapubic excision of a bladder neoplasm was performed on Oct. 15th, 1919. The tumour was reported to be a papilloma by the pathological department. He died six years later in Southwark Infirmary on Dec. 27th, 1925, "after many operations," his death being certified as due to "epithelioma of bladder."

(3) A charwoman underwent on Nov. 8th, 1911, a suprapubic excision of a papilloma of the bladder. The diagnosis was confirmed microscopically. She was readmitted ten years later and at cystoscopy another tumour was seen. This was removed by the suprapubic route on Feb. 9th, 1921. The pathological report was "papilloma; there are also foci present at the base which must be regarded as an early carcinomatous change." She died a year later.

That even pathological examination as a means of diagnosis was not always to be depended on, the following cases show :—

(4) A governess, aged 64, was admitted to hospital in May, 1917. At cystoscopy a tumour was seen. A suprapubic cystotomy was performed on May 30th, 1917, and a growth the size of an orange was removed, together with a portion of the bladder wall which was adherent to the bowel. The left ureter was involved. One and a quarter inches of the latter were excised and the remaining portion was transplanted into another part of the bladder wall. The pathological report on the tumour was "carcinoma." Four years later the patient was again admitted to hospital with symptoms, and suprapubic excision of a tumour was performed. The pathological report on this tumour was "papilloma." The patient was still alive in 1926, nine years after the alleged carcinoma had been removed, and was free from all symptoms.

(5) A labourer, aged 60, was admitted to hospital in May, 1918. At cystoscopy a growth was seen. This was excised suprapubically on May 16th, 1918, the pathological report being "carcinoma." Three years later the patient was again admitted with a recurrence, which was excised, and also reported on as a carcinoma. He attended in January, 1926, and was then in excellent health and free from all bladder symptoms, eight years after his first operation.

In the last two cases the length of time which had elapsed since the first diagnosis and treatment of the tumour, and in which the patients had been free from symptoms, might almost be regarded as evidence against the previous diagnosis of carcinoma. In fact, as pointed out by Raymond Johnson and T. W. P. Lawrence,[1] "it is extremely difficult, if not impossible, to determine whether a papillary tumour of the urinary tract is entirely benign."

Methods of Treatment.

The age and constitution of the patient, the type of tumour, its position and size, and the amount of involvement of the surrounding structures, all have their influence on the line of treatment. Successful treatment depends primarily on early diagnosis, and the use of the cystoscope for this purpose is of enormous advantage. With the modern instrument very little experience is required. Before its introduction the diagnosis was made from the patient's symptoms, by rectal examination, and by the use of a sound.

[1] A System of Surgery. Edited by C. C. Choyce, i., 483.

The methods of treatment employed on the above-mentioned 168 cases were either radical or palliative. The radical treatments were as follows :—

(*a*) *Defulgurisation*, or cauterisation of the tumour by means of a bi-polar high-frequency current, applied by a pointed flexible electrode through a cystoscope, such as is used for catheterising the ureters. The other electrode consists of a flat piece of metal which is held in close contact with the patient's thigh by a bandage. The bladder is previously distended with warm normal saline solution. The part of the tumour in contact with the pointed electrode shrivels up when the current is passed, and the whole tumour is destroyed by moving the electrode. Several applications at intervals of a week or ten days may be necessary.

This method is suitable for small tumours or small recurrences. It does away with the necessity for opening the bladder and is very useful in destroying small seedlings. It cannot, however, be used when there is much hæmorrhage. This method was used alone, or previous or subsequent to other methods of treatment, in 50 cases.

(*b*) *Excision of the tumour* through a suprapubic opening into the bladder may be performed with an electric or thermal cautery, curette, or knife, according to the consistency of the tumour and its liability to hæmorrhage. The diathermic cautery prevents hæmorrhage and is said to prevent the dissemination of seedlings. (Only one case showed dissemination of growth in the scar of the abdominal wall.) Suprapubic excision was used in 85 cases, either alone or previous or subsequent to other operations.

Twenty cases were treated by both the above methods, at different times.

(*c*) *Partial cystectomy* entails removing the tumour together with the surrounding bladder wall and involved structures. The ureters may have to be transplanted into another portion of the bladder or into the colon or skin, or a urinary fistula may be established. This operation was performed five times in the series. Complete cystectomy was never done.

No other forms of radical treatment were employed.

Palliative treatment resolved itself into operative and non-operative. The operative treatment consisted in suprapubic cystotomy, with drainage or the insertion of radium into the growth. This was done in 32 cases. Non-operative treatment, consisting of bladder lavage and deep X ray therapy, was the only thing possible in 20 cases.

Recurrence and After-history.

No matter what form of treatment was adopted, recurrences were frequent. Of the 59 patients known to be alive in 1926, 34 only have had no recurrences. Six of these were treated less than two years before the end of 1926, leaving 28 who have been two years or more without recurrence. Table III. shows the number of years they have been free from symptoms, and the particulars of their treatment.

TABLE III.

Years free from symptoms.	Suprapubic excision.	Defulgurisation.	Partial cystectomy.	Total.	Years free from symptoms.	Suprapubic excision.	Defulgurisation.	Partial cystectomy.	Total.
2	4	3	—	7	8	1	1	—	2
3	2	1	—	3	9	1	1	—	2
4	4	—	2	6	10	—	—	—	—
5	3	1	—	4	11	—	—	—	—
6	2	—	—	2	12	1	—	1	2
7	—	—	—	—	Totals ..	18	7	3	28

The number of cases among the whole 116 of the series who were traced, in which one or more recurrences took place, was 48. Table IV. shows the number of recurrences and details of their treatments. In addition to the cases tabulated one patient had an uncertain number of recurrences.

To summarise: Of the 116 patients who were traced to 1926 or to a fatal termination, 59, or 50·9 per cent., were still alive in 1926; 34, or 29·3 per cent., of them had had only one treatment and had no recurrences. As shown in Table IV., 48 of the 116, or 41·4 per cent., have had one or more recurrences. The remaining patients died after a single treatment, either radical or palliative. Treatment can, therefore, only be said to have been absolutely successful in 29·3 per cent. From Table II. it will be seen that the average duration of life after operation is 5·5 years. The total number of patients who had suprapubic excision only was 31 and those who had defulgurisation only 16. The percentage of absolutely successful treatments by suprapubic excision alone was 58·4 per cent., and by defulgurisation alone 43·75 per cent.

TABLE IV.

No. of recurrences.	Suprapubic excision only.	Defulgurisation only.	Combination*	Partial cystectomy.	Total.	No. of recurrences.	Suprapubic excision only.	Defulgurisation only.	Combination*	Partial cystectomy.	Total.
Once..	9	6	5	1	21	6 times	—	—	—	—	—
Twice	4	3	3	1	11	7 „	—	—	1	—	1
3 times	—	—	4	—	4	8 „	—	—	—	—	—
4 „	—	—	6	—	6	9 „	—	—	1	—	1
5 „	—	—	3	—	3	Totals	13	9	23	2	47

* Combination of defulgurisation and suprapubic excision at different times.

These figures are so small that very little value can be attached to them, and they give no indication of the type of tumour treated. Nevertheless, they seem to point to the fact that, in the large majority of cases, suprapubic excision gives the better results. Of the two patients in whom the disease occurred at the early age of 18, the male underwent a suprapubic excision in 1921 and has been free from symptoms since then. Defulgurisation on the female in 1922 was followed by two recurrences, both of which were also defulgurised, the last occasion being in 1926.

Rafin's statistics of the operation of suprapubic excision, quoted by Sir J. Thomson Walker,[2] show a mortality-rate of 3·8 per cent. in 156 cases, and recurrence in 28 per cent. The corresponding figures in this series (taken only from traced cases) were 6·2 per cent. and 43 per cent. respectively. It must, however, be borne in mind that many of the cases in this series were definitely carcinomata, whereas Rafin's statistics relate only to papillomata, and are, therefore, likely to be much more favourable.

Conclusions.

1. Epithelial vesical tumours have a high rate of mortality, in spite of treatment.
2. Males are more susceptible to the disease than females, in the proportion of 3 to 1.
3. Papillary tumours tend to recur in a large number of cases; in this series in 41·4 per cent.
4. The diagnosis of malignancy is extraordinarily difficult in many cases, and pathological examination cannot be relied upon.
5. Treatment of the tumours by means of suprapubic excision seems to yield slightly more favourable results than defulgurisation.

I should like to acknowledge my indebtedness to Sir Cuthbert Wallace, director, and Mr. B. C. Maybury, assistant director, of the Clinical Surgical Unit, St. Thomas's Hospital, for their useful suggestions and advice in the compilation of this thesis; to Mr. C. A. R. Nitch, for the use of his own records; to Mr. C. V. Patrick, late surgical registrar, for facilities in looking up the records, and to Miss J. E. Creese, secretary to the clinical units, for her valuable assistance in helping to trace a large number of patients.

[2] A System of Surgery, ii., 912.

INFECTION WITH *B. DYSENTERIÆ* SONNE.

A FATAL CASE INVOLVING THE SMALL INTESTINE AND SIMULATING FOOD POISONING.

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THE recovery in the College of Medicine laboratory, Newcastle-on-Tyne, of dysentery bacilli from a considerable number of undiagnosed cases has led during recent years to an increase in the number of specimens submitted and a steady rise in the number of positives. The majority of the cases have been comparatively mild, with definite symptoms, but there has been a proportion, mainly in young children, with ill-marked signs, in which the disease has been fulminant and the organism isolated post mortem. An interesting point is that on more than one occasion the organism has been isolated very many hours after death; this raises the question whether its unusual persistence may not be related to an absence of bacteriophage similar to that lately described by d'Herelle and Malone[1] in acute cholera.

Until recently, all these fatalities had resulted from one or other variety of *B. dysenteriæ* Flexner, but in the following case the organism proved to be the bacillus first described by Sonne,[2] of Copenhagen, and now usually known by his name. The common experience is that this organism gives rise to mild attacks, but Mita,[3] in describing two organisms which he named pseudo-dysentery A and B, recorded six fulminating and fatal cases in a total of 73, although most of them were mild.

Smith[4] seems to claim that Mita's organisms are one and the same with *B. dysenteriæ* Sonne; their reactions, as described, are identical. Cultures, obtained from the National Collection, were found not only to give precisely similar reactions to those of the Sonne organism, but also to agglutinate well with the Oxford Sonne serum.

CASE 1.—The patient was a boy, aged 11, whose family consisted of father, mother, three sons, and a daughter. On May 16th, 1928, he had a severe headache, complained of tiredness and went to bed, but by next day had recovered. On the 20th, at about 10.30 A.M., he complained of pains in the stomach, which were succeeded by diarrhœa with brown slimy motions, and in the evening by several attacks of vomiting. At 5 A.M. on the 21st he was found in bed unconscious and incontinent. He was admitted to the Infectious Diseases Hospital at 1 P.M. the same day. He remained unconscious, vomited once—greenish fluid with mucus—and, still incontinent, with blood and mucus in the motions, he died at 8 P.M.

The post-mortem examination, held 13 hours after death, revealed marked congestion, chiefly of the ileum and cæcum and to a lesser extent of the descending colon. The adjacent lymphatic glands were slightly enlarged and there was definite splenic enlargement. The heart, liver and kidneys showed definite toxic changes. No gross pathological change was detected in the central nervous system. The stomach and a portion of small intestine and of colon were ligatured and sent direct to the laboratory, together with the spleen, but no blood could be obtained. The colon and stomach were found to contain adhesive mucus and films from the former showed inspissated epithelium. The portion of small intestine, which was inflamed, contained blood-stained liquid fæces, and films showed this to consist mainly of red-blood and pus cells.

Cultures, both direct and after brilliant green reinforcement, were sown on MacConkey plates from the contents of the hollow viscera and the spleen. No pathogenic organisms were obtained from the stomach, colon, or spleen, but the plates from the intestine showed large numbers of white colonies with crenated edge and heaped-up centre, which in 24 hours gave the reactions of *B. dysenteriæ* Flexner. They differed, however, in the following particulars, which have been found to be very suggestive of *B. dysenteriæ* Sonne. Growth was unusually profuse and there was a tendency to

sedimentation, while production of acid from glucose and mannite was more marked after 24 hours than is usual with *B. dysenteriæ* Flexner. Brilliant green seemed to have comparatively little inhibitory effect, a point also noted but not recorded with a previous case.[5]

Subsequently the reactions changed in the manner characteristic of *B. dysenteriæ* Sonne, including the late clotting of milk. Nine colonies give similar reactions and with five of these agglutination was tried against polyvalent Flexner, typhoid, and a rather old "Sonne" serum. There was a total absence with the first two, but all showed more or less agglutination with the last. The most agglutinable strain was then tried against the Oxford serum, and agglutinated to practically the same titre as the homologous emulsion, although it failed to show a trace with the five Flexner-type Oxford sera.

Inquiry into Food Ingested by the Patient and the Rest of Family.

The patient appears to have partaken of the ordinary meals of the family up to May 20th, including sausage for dinner on the 19th, but none of the others showed any signs of illness at the time. In addition, he had ice-cream on the 19th and some whelks about noon of the day (20th) on which he first developed severe symptoms.

One of his brothers (A), about a month previously, together with two other boys, one (Case 2) living in the upper flat of the same house and one (B) further along the street, ate some bruised fruit and all became ill. A and B had evanescent symptoms, but Case 2 died after a few hours' illness. The father of my patient, aged 53, was ill from May 31st to June 3rd, with pains in the stomach and slight diarrhœa, which he ascribed to drinking some water from a "runner" in the country while on holiday on the 28th. None of the other members of the family seemed to have been ill.

The family, of which the second fatal case was a member, lived, as already mentioned, in the upper flat, and consisted of father, mother, and three children under 12.

CASE 2.—This boy, aged 7, after eating the bruised fruit on April 11th, became ill at 8 P.M. of that day, with pains in the head, vomiting, but no diarrhœa, and died three hours later. The death was inquired into by the coroner and a post-mortem was held, but unfortunately, owing to a misunderstanding, the gut was slit from end to end during the autopsy and washed, so that when it arrived at the laboratory it was not possible to carry out a proper bacteriological examination, and no pathogenic organisms were isolated.

Dr. G. E. Stephenson, who performed the post-mortem, has kindly given an account of the findings:—

"Stomach, duodenum, ileum and large intestine all showed hyperæmia. There was in the ileum, especially in the upper part, well-marked swelling and hyperæmia of Peyer's patches, with general hyperplasia of lymphoid tissue, there as well as in large intestine. The spleen was slightly enlarged and the liver showed an acute toxic change. No gross naked-eye change was apparent in the other organs."

This boy is said, with several others, to have had some ice-cream on the previous day, but there is no evidence to incriminate this. In addition to the three boys, the father of Case 2 is said to have suffered from diarrhœa on the night of April 11th, but otherwise there is no history of illness in the family.

The Question of a Carrier.

As soon as it was determined that the organism isolated from Case 1 was *B. dysenteriæ* Sonne inquiry was made whether any members of the two families had been in districts where the disease has been prevalent. None of the family gave such a history, but the father of Case 2 had been in Glasgow for eight months, and only returned at Easter, just before his son became ill and died. This is rather a coincidence, although there was in this case no direct evidence of the nature of the infection, and the father's blood and fæces, when examined on one occasion, proved negative. The blood and fæces of the entire family of Case 1 were examined on two occasions, and on the first an organism giving the typical Sonne reactions was isolated from the fæces of the father and the daughter. Tested against Oxford Sonne serum these proved inagglutinable, but eventually, after considerable subculture, they displayed some degree of agglutinability. Curiously enough, however, an organism was isolated in large numbers almost at the same time from an entirely unconnected case, a girl of 1½ years suffering from dysenteric symptoms, and this gave similar reactions and proved persistently inagglutinable even after subculture. The blood serum of the family of Case 1 showed no evidence of agglutinins against the organism isolated.

Discussion.

Judging from this case and from Mita's experience, it would appear that the Sonne bacillus may give rise at times to severe enteritis and fatal toxæmia. Wiseman,[6] in describing a Glasgow outbreak of enteritis due to the Sonne bacillus, has recently called attention to the occurrence of inagglutinable types of the organism. This is borne out by my case and is interesting in view of the three outbreaks of food poisoning, with three fatalities among children (recorded by Savage and Bruce White[7]), in which the organism isolated gave the reactions of Sonne and proved inagglutinable with a specific serum, although it was partially agglutinated by a serum prepared from Getting's bacillus.

No definite evidence of the source of infection could be obtained, and it is quite possible that the dietary indiscretions which preceded the illness of the two boys and the father may merely have served to fan the flame of an already existent but dormant infection. The father, at all events, was found later to be harbouring the organism.

Addendum.—Since this paper was written a very similar case has been recorded by Howel Evans.[8] Dr. W. M. Scott, of the Ministry of Health, to whom the cultures were sent, has since found that all four strains agglutinate well with a Sonne serum.

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A SIMPLE METHOD OF PERFORMING ARTHROPLASTY IN TRUE ANKYLOSIS OF THE JAW.

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IN the excision of the mandibular condyle surgical freedom is limited in three directions: below, retraction may stretch the facial nerve; above, the brain has more than once been injured; and, on the medial side, the internal maxillary artery lies close to the neck of the mandible. Tubby[1] figures 12 different incisions for excising the joint—a sign that none is satisfactory—and whichever the surgeon employs he is cramped if he uses ordinary tools. This constraint and risk of injury disappear with the use of the special drill devised by Hudson for opening the skull. Two advantages make this well-known drill the instrument of choice for removing bone in ankylosis of the jaw: (1) it can be used in a cramped field, thus leaving no excuse for stretching the facial nerve; (2) it jams directly it perforates, and does no injury to brain or vessel. The Hudson drill does not fail to stop provided the bone can resist sufficiently to prevent the drill being pushed through it. I have once seen the drill plunge into a dog's cerebellum but,

[1] Tubby, A. H.: Deformities, including Diseases of the Bones and Joints.

warned by this accident, we have been able to avoid it in a series of more than 40 intracranial experiments, made in collaboration with Prof. Heathcote. We have learnt that the drill can safely be used on very thin bone if the pressure is gentle and discriminate. There is, of course, no risk of unintentional penetration when drilling the bony mass in true ankylosis of the jaw.

The Operation.

The tragus is a useful landmark, since the normal line of the joint, continued back, bisects its base. The joint lies one finger-breadth in front of it. The incision begins in front of the tragus, immediately anterior to the pulsation of the temporal artery; it extends for one and a half inches along the lower border of the zygomatic arch. From the hinder end of this cut a second is made, at right angles to the first, extending vertically for four inches above the zygoma and for half an inch only below it. This incision is, of course, a common one for arthroplasty of the jaw, and—provided the Hudson drill is used—gives good access. It is my practice here, as in every "clean" operation, to apply side-curtains. They are fixed to the skin by means of Michel clips, as I have recommended elsewhere for small or multiple incisions.[1] In this way the surgeon is not embarrassed by the handles of towel-forceps. A clip bisecting the base of the tragus marks the level of the normal joint. The site of ankylosis is exposed by displacing downwards and forwards the hindmost fibres of the masseter muscle. The three bits of the Hudson drill, usually numbered 1, 2, and 3, are used in this order to remove the ankylosing bone, just as they are used in drilling the skull, the bits numbered 2 and 3 enlarging the hole made by the first. All these jam directly they have pierced the bone.

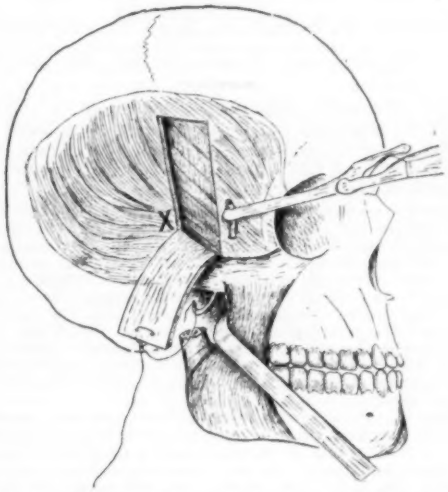
FIG. 1.

The glenoid fossa of the temporal bone seen from below, showing how the free arch of the zygoma here becomes a shelf. The suture guiding the fascial flap must—like the arrow—avoid the shelf and go *forward* under the arch.

The Fascial Flap.—A flap of fascia is next cut—either from the temporal fascia itself or from the fatty connective tissue covering it—for interposition between the neck of the mandible and the site of the glenoid cavity. Writers vaguely advise that this flap be sutured into place, which is not easy to do as the bottom of the deep, narrow wound is unsuited for placing a stitch. A neat adjustment can be made by a simple manœuvre suggested to me during an operation by my former clinical assistant, Dr. Edward Sadek. The middle part of a catgut suture is fastened to the free extremity of the flap and, by means of a curved needle, each end of the catgut is brought in turn from below upward, deep to the arch of the zygoma. The needle goes through the temporal muscle and the flap is drawn down into place by pulling on the suture; it is then made fast by knotting the ends of the catgut on the temporal belly.

The Hinge.—A detail of anatomy in the skull makes it imperative to hinge the flap in such a way that when the suture guiding it is drawn under the zygoma the flap will fully separate the raw faces of the new joint. Fig. 1 shows that it is not possible to pass a needle directly round the zygoma at the glenoid site, for at that place the free bony arch becomes a shelf attached to the skull. The needle which carries the guiding suture must, therefore, travel upward beneath the arch in a forward direction. If, then, the base of the flap is parallel to the zygoma, the fascia—strained forward by the suture and folding on a transverse hinge—will come to lie in a futile, ectopic, position in front of the glenoid site. The flap, however, can be made to lie properly by providing its pedicle with a hinge which is oblique; it then folds vertically down under the forward strain (Fig. 2). The correct slope of the hinge is obtained by cutting the flap in the form of an inch-wide strip, with its free end three inches above the zygoma, taking care that in front the incision goes right down to the zygoma, and behind stops a thumb's-breadth short. The flap, hinged obliquely in this way at the pedicle, would of itself droop backwards, but under the forward pull of the guiding suture it takes a middle course and folds straight down into place. A final stitch serves to fix the centre of motion.

FIG. 2.



The flap is outlined by a long cut in front and a short cut behind; its pedicle has therefore an *oblique* hinge. The flap folds vertically when pulled forward by the guiding suture and so covers the glenoid area. (A stitch at X fixes the centre of motion.)

After-treatment.—The patient is encouraged to chew and should begin to try when he recovers from the effects of anæsthesia. A boy, aged 15, who had had a bilateral ankylosis of the jaw for three years, was able to chew meat on the fourth day after his second arthroplasty. The first arthroplasty was done ten days before the second.

My thanks are due to Dr. Boris Boulgakow, Curator of the Museums of the Faculty of Medicine, Cairo, for the two figures which illustrate my paper. The finishing touch of the oblique hinge I owe to my wife.

[1] Henry, A. K.: Brit. Med. Jour., 1927, i., 663.

LIVERPOOL OPEN-AIR HOSPITAL FOR CHILDREN.—On Saturday last the Earl of Derby opened a new artificial light and treatment block which has been added to this hospital at a cost of £17,000. In addition to the artificial light treatment rooms the block contains an operating suite, a dental department, plaster and X ray rooms, gymnasium, laboratory, and dispensary.

FEE FOR REPORT TO CORONER.—The Finance Committee of the Worcestershire County Council, having received a suggestion from the local branch of the British Medical Association that medical practitioners who supply to coroners at his request a written report in connexion with a death should be paid a fee of 10*s.* 6*d.* for the report, and having been informed that it is legal for local authorities to authorise such payment, has recommended the Council to pay the fee.

Clinical and Laboratory Notes.

TWO CASES OF FAMILIAL ENLARGEMENT OF THE THYMUS ASSOCIATED WITH COLLAPSE OF LUNG.

By GERALD M. SLOT, M.D., M.R.C.P. LOND., D.P.H.,
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THE interest of these cases lies chiefly in the fact that two members of the family seem to have died of the same condition—a syndrome in which gross enlargement of the thymus is associated with the collapse of the right lung.

CASE 1.—G. W., aged 5 months, was admitted to Guy's Hospital on Nov. 10th, 1926, complaining of dyspnœa and cyanosis, which had existed since birth. The respiration was entirely thoracic and inverted—i.e., the abdominal wall was retracted during inspiration. Breathing was laboured, with occasional sighing respiration. Previous to an X ray, three diagnoses were suggested: (*a*) Anterior poliomyelitis affecting the phrenic nerve. (*b*) Birth injury affecting the phrenic nerve. (*c*) Diaphragmatic hernia. An X ray examination taken without a bismuth meal showed a large opacity at the left apex which was thought to be the thymus gland.

While the patient was being given a bismuth meal for an X ray examination in view of the possibility of diaphragmatic hernia, the meal was suddenly regurgitated through the mouth and nose. He became very cyanosed and died suddenly on Nov. 11th, 1926. At the post-mortem the thymus was found to be about three times its normal size, weighing 26 g., and was partially adherent to the pericardium. There was a collapse of the upper and middle lobes of the right lung and partial collapse of the lower lobe of the right lung.

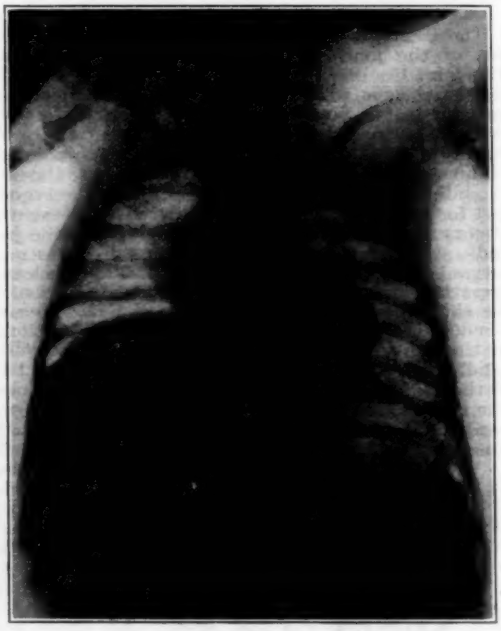
CASE 2.—E. W., sister of G. W., was admitted to the Royal Waterloo Hospital with respiratory embarrassment for observation and diagnosis on July 25th, 1928. She was 5 months old. Two months before admission she had shown signs of difficulty in respiration. This became more marked, so that the child could only feed at the breast for five minutes at a time. The confinement had been normal and the weight at birth 6 lb. 11 oz.

On admission the child was ill-nourished, pale, but not cyanosed. The finger-nails and ends of the fingers were normal. The cry was weak and infrequent. She lay in the bed with the head fully retracted, but the retraction was not fixed. The striking feature was the marked inspiratory effort, which ended in a short grunt and involved the whole accessory muscles of respiration, abdominal, thoracic, and alæ nasæ. The respiratory rate was, on an average, 45 per minute. Temperature averaged 99° F. and the pulse 140. The mouth and upper air passages were clear, the heart not displaced; rhythm and heart sounds were normal. The chest was not retracted, but there was practically no movement of the right side. The percussion note was dull from the base to the apex, both anteriorly and posteriorly on the right side. Breath sounds were very weak and distant, the air entry being very feeble. The breathing was vesicular and no adventitious sounds were heard. The left side of the chest appeared normal. Nothing abnormal could be felt in the suprasternal notch, and there was no enlargement or displacement of the liver or spleen. No enlarged glands were palpable.

A skiagram (here reproduced) showed a heavy shadow extending from the right of the mediastinum upwards into the neck; the right side of the diaphragm was elevated. The stomach was large and distended with gas. The right lung has evidently re-expanded to some extent. The shadow was compatible with thymic enlargement.

The child took her feeds well and was at the start fed partly by breast, but gradually lost weight in spite of all feeding efforts and died on August 2nd, 1928.

The *autopsy*, performed by Dr. H. W. C. Vines, showed the body of a well-nourished infant with no external injuries. When the thorax was opened, the thymus appeared to be enlarged, the lungs collapsed and small. The thymus weighed approximately 56 g. The lungs were slightly congested. The left lung floated in water, but the right (smaller) lung did not. Their appearance suggested collapse or failure to expand rather than pathological consolidation. The trachea showed no gross evidence of compression. The heart showed minute petechial hæmorrhages under the visceral pericardium. The veins were dilated. The liver, spleen, and kidneys were congested. The intestines did not show any very marked enlargement of the lymphoid follicles. There were numerous rather enlarged lymph glands in the mesentery. The cortex of the suprarenals appeared to be rather thin, and the medulla not very evident. There was no evidence of hæmorrhage. Microscopically, the thymus appeared active and vascular. Hassall's corpuscles were numerous and large. The lung showed collapse and congestion; the mesenteric lymph glands simple enlargement. In the suprarenals the medullary cells were present in patches, but appear to have been replaced by vascular connective tissue.



CASE 2.—Skiagram showing heavy shadow extending from the right of the mediastinum upwards into the neck.

Remarks.

In a large number of post-mortem examinations where death has occurred either under anæsthetic or suddenly in young children, I have found a large thymus, but have never previously observed any collapse of the lung. These, however, have been acute cases where there has been no previous history of respiratory distress. In Case 2 there was no evidence of tracheostenosis or compression. It is difficult to say definitely whether the right lung had ever expanded or whether the collapse was of post-natal origin. The absence of recession and the non-displacement of the heart, together with the X ray appearances, would seem perhaps to indicate a gradual collapse.

Dysthymic constitutions are well recognised as having constitutional disturbances, delayed growth, and sometimes rickety changes. The noisy respiration, with a slight souffle, best heard in the horizontal position, are well known. Acute phenomena pass away but leave the child in a state of torpor which may give rise to anxiety. Percussion and skiagrams, especially when there is a large mediothoracic shadow, greatly increased in its upper part, may give a clue.

Various reasons have been suggested for death due to thymic conditions—e.g., vagal stimulation, compression of inferior cardiac nerve, stimulation of cardiac centres producing inhibition, compression of phrenic nerve producing diaphragmatic paralysis, lymphotoxæmia. Much discussion has centred round the question as to whether direct pressure of the thymus on the trachea is responsible for the dyspnœa.

In Case 2 the retraction of the head would tend to project the vertebræ forward and diminish the

superior opening of the thorax. Since the enlargement was chiefly on the right side, obstruction, if obstruction there was, would probably be on the right main bronchus, causing the abnormal condition of the right lung. There was no evidence of tracheostenosis in this case and none to support J.-A. Hammar's contention that most cases of thymic death are due to compression of the trachea. Through the courtesy of Dr. F. Parkes Weber, I have traced an account[1] of familial sudden thymic death, but in the cases recorded above death was not sudden or unexpected.

I have been unable to trace in the literature a description of familial cases with enlargement of the thymus associated with a collapsed condition of the right lung.

I am indebted to Mr. H. L. Eason and Dr. H. C. Cameron, of Guy's Hospital, for the account of Case 1, and to Dr. A. S. Woodwark for permission to publish Case 2. I should also like to thank my house physician, Dr. C. G. Walker, for help with the clinical investigation.

A CASE OF ANEURYSM OF THE MITRAL CUSP.

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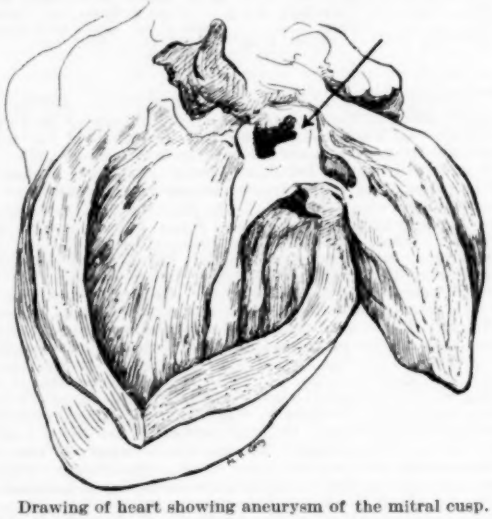
During the course of malignant endocarditis bacterial emboli break off from the affected valves and are distributed all over the body. These emboli cause septic infarction of the organs in which they are arrested. When, as not uncommonly occurs, the site of arrest is a vas vasorum, a mycotic aneurysm may follow; this event may take place in any artery.



Drawing of heart showing aneurysm of the mitral cusp.

Osler reports a case in which five such aneurysms were present in the thoracic aorta. Many other cases have been put on record, and every artery of any size has been affected. More rarely the site of aneurysm formation is the heart itself, and in such cases the lesion may involve the valves. According to Osler (System, 1908), the commonest site for such an aneurysm is the aortic valve, in which case the cusps are dilated towards the ventricle. Less commonly, a similar condition occurs in the mitral valve, the aortic cusp being more frequently affected than the posterior. In any of these sites the aneurysm may rupture or may be filled with fibrin. The following case illustrates the commoner type of mitral aneurysm.

[1] Handbuch der Kinderheilkunde, 3rd edition, vol. i., 1923.

A girl of 15 was admitted into Ancoats Hospital under the care of Dr. Kletz on Feb. 2nd, 1928, suffering from pyrexia. The previous history showed measles and chickenpox. For many years she had been troubled with rheumatic pains and stiffness of the knees, but recently she had been free from them. Her present illness began insidiously at Christmas, 1927, with headache and severe lassitude. During the first week in January she had a sensation as of a purple veil drawn over the outer half of the visual field of the right eye. After a few days this disappeared. She then tried to resume work but had to return to bed. The headache increased in severity during the last week before admission; she became very short of breath and purple painful spots appeared on the fingers and toes, remained for a day or so and disappeared. The sensation of the purple veil over the right eye returned. For a day or so she complained of pain in the right loin, but had no hæmaturia. There had been no indigestion and the bowels were regular.

Examination.—Patient was extremely pale, with a floury skin and slight malar flush. Intelligence and cheerfulness above normal, as is frequently noted in this disease. Nothing abnormal was found in the alimentary and respiratory systems. The apex-beat was found in the sixth space in the anterior axillary line. A very harsh systolic murmur was heard in the mitral area. This was propagated to the axilla and was heard behind. There were systolic and presystolic murmurs in the aortic area. The heart rhythm was regular. Blood pressure was 110/80. There were some petechiæ, red and painful to touch, the feet and conjunctivæ being most affected. There was a small hæmorrhage in the macular region of the right fundus oculi, which probably accounted for the purple veil sensation.

During the course of the disease, which lasted for three weeks in hospital, no change was found in the heart. The temperature was swinging up to 102° F., but blood culture was negative. At no time was the spleen felt.

Post mortem Examination.—The heart was much enlarged. The right side was normal, the left side greatly hypertrophied and dilated. The mitral valve was encrusted with recent vegetations. In the aortic cusp of the valve was an aneurysm extending three-quarters of an inch into the auricle. This was ruptured at its apex, and the margins were covered with vegetations. The aortic valve was also scarred and encrusted with recent vegetations. The only other abnormality found was an old infarct of the left kidney.

In all probability the rupture of the aneurysm had taken place some weeks previously and the resulting incompetence was responsible for the harsh systolic murmur.

I am indebted to Dr. Norman Kletz, under whose care the patient was admitted, and to Dr. Arnold Renshaw, pathologist to the hospital, for permission to publish this case.

THE BROMSULPHALEIN TEST IN EARLY DISEASE OF THE LIVER.

By A. D. Fraser, B.Sc., M.B. Glasg.,
PATHOLOGIST TO THE BRISTOL ROYAL INFIRMARY.

The bromsulphalein test for liver function, introduced by Rosenthal and White,[1] depends upon the capacity of the liver cells to remove the dye phenoltetrabromphthalein sodium sulphonate from the blood stream and excrete it in the bile.

These authors found that when a certain amount of the dye—2 mg. per kg. of body-weight—was injected intravenously, none of it could be demonstrated in the blood 30 minutes later if the liver were normal. In marked liver disease, however, there was retention of dye, the amount retained being apparently proportionate to the degree of damage to the liver. No cases of early liver disease were examined by Rosenthal and White, but they suggested that the amount of dye retained five minutes after the injection would indicate the extent of the liver insufficiency. In their series of normals the dye retention at the five minute interval varied from 20 to 50 per cent., with an average of 35 per cent. There were no local or general ill-effects from the use of the dye.

Others have made use of this test, and report favourably on it as a hepatic function test in advanced disease of the liver. Friedenwald and Armstrong[2] found retention of the dye in catarrhal jaundice,

TABLE I.—*Early Disease of the Liver.*

Sex.	Age.	Clinical diagnosis.	Units of bilirubin in serum.	Blood-sugar per cent.						Bromsulphalein test. Percentage of dye retained.	
				Before lævulose.	½ hr. later.	1 hr. later.	1½ hr. later.	2 hr. later.	Rise in mg. per cent.	5 mins.	30 mins.
M.	26	Manganese toxæmia.	0·5	0·102	0·117	0·133	0·117	0·112	31	15	0
M.	40		0·25	0·083	0·108	0·105	0·104	0·101	25	10	0
M.	40		0·5	0·090	0·120	0·121	0·120	0·120	31	20	0
M.	25		0·5	0·090	0·090	0·095	0·095	0·090	5	30	0
M.	39		0·25	0·099	0·105	0·097	0·093	0·089	6	10	0
M.	21		0·5	0·101	0·115	0·112	0·093	—	14	25	0
M.	55		0·5	0·108	0·129	0·122	0·122	0·111	21	15	0
M.	28	Banti's disease.	0·5	0·098	0·110	0·133	0·125	0·104	35	10	0
M.	15		0·5	0·097	0·133	0·130	—	0·130	36	20	0
F.	47		0·5	0·100	0·137	0·114	0·104	0·102	37	15	0
M.	37	Catarrhal jaundice.	7	0·136	0·156	0·185	0·173	0·166	49	20	0
M.	21		8	0·085	0·101	0·124	0·117	0·114	39	15	0
F.	46		2·5	0·100	0·115	0·124	0·138	0·123	38	20	0
F.	27		14	0·102	0·134	0·126	0·108	0·104	32	10	0
M.	64		4	0·113	0·150	0·136	0·133	0·120	37	25	0
M.	26		6	0·097	0·115	0·152	0·134	0·126	55	15	0
M.	60	Specific liver.	9	0·110	0·129	0·133	0·142	0·133	32	10	0
F.	19	Acholuric jaundice.	7	0·100	0·129	—	0·120	0·103	29	20	0
F.	35	Hyperemesis gravidarum.	8	—	—	—	—	—	—	15	0
F.	47	Familial jaundice.	8	0·080	0·131	0·120	0·114	0·109	51	10	0

cirrhosis of the liver, and carcinoma of the liver. A negative result in two cases of cirrhosis of the liver with free abdominal fluid was regarded by them as due to compensatory hyperplasia of liver cells. Vaughan's[3] opinion was that in obstructive jaundice, and in jaundice due to liver damage, the bromsulphalein retention agreed roughly with the bilirubin retention. King[4] and Siegel[5] considered that the test might prove useful for the differentiation of nephritic and pre-eclamptic types of toxæmia and of neurotic and toxic vomiting.

To determine the usefulness of this test in early liver disease a series of patients with suspected minor degrees of liver insufficiency were chosen, and the lævulose-tolerance and bromsulphalein tests were compared. In each case also some indication of the degree of disturbance in pigment metabolism was obtained by estimating the blood bilirubin by van den Bergh's method. The technique used in the dye test was as recommended by Rosenthal and White, and the bromsulphalein was obtained in 5 per cent. solution from Messrs. Hynson, Westcott, and Dunning, of Baltimore, U.S.A. The exact quantity, in cubic centimetres, of this 5 per cent. solution to be injected was obtained by dividing the patient's weight in pounds by 55. The amount of dye retained in the blood was determined at intervals of 5 and of 30 minutes.

For the lævulose-tolerance test half-hourly estimations of the blood-sugar were made for two hours after the ingestion of 50 g. of lævulose on a fasting stomach. A rise in the blood-sugar of 20 mg. with a non-return to normal was considered positive.

The results of these tests are given in Table I., and the figures obtained with the dye test in six normal individuals are shown in Table II.

TABLE II.—*Normals.*

Sex.	Age.	Bromsulphalein test. Percentage of dye retained.	
		5 minutes.	30 minutes.
F.	44	25	0
M.	32	15	0
M.	45	20	0
M.	38	10	0
F.	26	15	0
M.	52	15	0

Summary and Conclusions.

Of 20 cases with early liver disease the lævulose-tolerance test was positive in 16, while the bromsulphalein content of the blood serum 5 and 30 minutes after injection of the dye showed no variation from the normal. Ten of the 16 had bilirubin retention. The five-minute interval retention of bromsulphalein does not appear to afford much information in early liver disease, nor does the retention of bromsulphalein run parallel with the bilirubin retention.

I am indebted to my colleagues on the staff of the Bristol Royal Infirmary for their kindness in allowing me to examine their patients.

References.—1. Rosenthal, S. M., and White, E. C.: Jour. Amer. Med. Assoc., 1925, lxxxiv., 1112. 2. Friedenwald, J., and Armstrong, W. W.: Med. Jour. and Rec., 1926, cxxiv., 679. 3. Vaughan, S. L.: Bull. Buffalo Gen. Hosp., 1927, v., 3. 4. King, E. L.: Amer. Jour. Obst. and Gynec., 1926, xii., 577. 5. Siegel, I. A.: Ibid., 1927, xiv., 300.

INTERNATIONAL HOSPITAL CONGRESS, 1929.—On August 29th, at the headquarters of the League of Red Cross Societies in Paris, a meeting was convened of the International Executive Committee of the International Hospital Congress, of which Dr. René Sand, Technical Counsellor of the League of Red Cross Societies, is chairman, and Dr. Lewinski-Corwin, Director of the Hospital Information and Service Bureau, United Hospital Fund, U.S.A., is secretary-general. Great Britain was represented by Mr. J. Courtney Buchanan, honorary secretary of the British Hospitals Association; Mr. W. H. Harper, house governor of the Wolverhampton and Staffordshire Hospital; and Mr. G. Watts, representing the Incorporated Association of Hospital Officers. The committee agreed with the American Hospital Association in its proposal to hold the International Congress at Atlantic City on June 13th–15th, 1929. In accordance with the practice of the American Hospital Association, the Congress is to be open to hospital administrators, physicians, surgeons, nurses, architects, engineers, and others interested in hospital problems. Official invitations are to be sent to the various Governments through the Secretary of State in Washington, and at the same time a questionaire will be sent to each country on its hospital situation and statistics. The American Hospital Association proposes to organise a tour of inspection of the hospitals of New York, Philadelphia, Baltimore, and other centres for the benefit of the official delegates from June 5th to 12th. The object of the Congress, the first of its kind, is to facilitate personal contacts, to provide for exchange of information, and to promote discussion among persons interested in hospitals throughout the world, whether public or voluntary. The preliminary programme provides for an address on essential hospital functions, and this will be followed by discussions on hospital planning in relation to economy and efficiency, the problem of hospital economies, the respective fields of public and private hospital work, the questions related to psychopathic hospitals and hospitals for chronic disease, and various other matters such as the creation of an International Hospital Association. For further particulars of the International Hospital Congress, the membership fee of which is five dollars, inquiries should be addressed to Dr. René Sand, 2, Avenue Velasquez, Paris VIII.; or to Dr. E. H. Lewinski-Corwin, the American Hospital Association, 2 East 103rd Street, New York.

Reviews and Notices of Books.

THE GENESIS OF EPIDEMICS.

By CLIFFORD ALLCHIN GILL, M.R.C.S., L.R.C.P., D.P.H., D.T.M. & H. Eng., Director of Public Health, Punjab. London: Baillière, Tindall and Cox. 1928. Pp. 550. 21*s*.

THE havoc wrought throughout the world by epidemic diseases makes the solution of the problem of their causation one of peculiar interest and importance. Theories and speculations to account for their occurrence have not been lacking; and, although many of these have been proved to be inconsistent with the facts revealed by advancing medical knowledge, there is still no unanimity of opinion among epidemiologists. It is only from prolonged and systematic effort to collect, arrange, and correlate all the facts that a consistent and intelligible theory is likely to emerge. We are, therefore, indebted to Dr. C. A. Gill, director of public health in the Punjab, who has published the outcome of a painstaking study of epidemics, in particular of malaria. The subject matter is presented in five parts, of which the first is introductory, consisting of a brief account of the views held by various authorities as to the cause of epidemics, a critical analysis of the methods employed in epidemiological research, and a summary of the author's own theory of the genesis of epidemics. The material from which the theory has been evolved is presented in detail in the second part of the work, where an interesting account of the investigation of epidemic malaria is followed by a note on the epidemiological features of influenza and plague. Since epidemicity is confined neither to diseases of which the causative organisms belong to closely allied groups nor to those exhibiting similar modes of transmission, these three widely diverse diseases are well chosen as examples. In Part III. the general applicability of Dr. Gill's theory to all epidemiological phenomena is examined and discussed, while Part IV. is devoted to a consideration of the response of disease to the influence of evolution and the effect of climate on health and disease in the light of the views propounded in the preceding chapters. Finally, in Part V., the failure of certain diseases to assume epidemic and pandemic characteristics is shown to be in no way inconsistent with the general argument; certain practical deductions from the study are summarised, and their bearing on the practice of preventive medicine reviewed.

As a result of his study, the author has come to the conclusion that the generic features of all epidemics, irrespective of the nature of the *materies morbi*, are the outcome of the same mechanism. "Nature exhibits a remarkable unity of design, and it would, therefore, be as unnatural to anticipate a separate mechanism of epidemicity in each specific disease as to assume a separate act of creation in the case of each zoological species." Dr. Gill's theory as to the nature of this mechanism—the quantum theory—postulates that the essential factor in the causation of epidemics is a loss of equilibrium between the dose of toxin and the degree of resistance, or, in short, between infection and immunity. If we regard an epidemic as the analogue in the community of an attack of disease in the individual, the theory is simply an extension of existing knowledge concerning individual infection, involving, therefore, neither the adoption of any new principle nor the formulation of any fresh hypothesis. If this theory be ultimately found to fit all the facts, the complexity of the problem will be materially reduced and future investigation simplified. The arguments presented in its favour are skilful, but not always convincing. For example, the author says, "a sudden depression of communal immunity is less likely to occur than a sudden increase in the amount of infection, and it is consequently held that circumstances conducive to a sudden increase of the infection quantum play a predominant part in epidemic explosions." An epidemic visitation is undoubtedly a sudden upheaval; but there is no apparent reason why the forces requisite to lead to a "loss of equilibrium" should be assembled in an equally dramatic manner. A gradual increase of susceptible persons—i.e., a gradual decrease in communal immunity—has, on this theory, as much chance of ultimately upsetting the balance as a gradual or sudden increase of the infection quantum. Again, "since, during their passage from one human host to another parasites are exposed, directly or indirectly, to the influence of meteorological conditions and atmospheric states, it is held that the latter are intimately concerned in determining the frequency and intensity of epidemics." This point of view has led Dr. Gill to attribute great prominence in the genesis of epidemics to meteorological conditions. It need only be noted that the length of exposure of organisms during their passage from one human host to another, at least in diseases spread by direct transmission, must be small; that under laboratory conditions, where meteorological variations are almost negligible, epidemics tend to occur and recur, and that the host as well as the parasite is susceptible to changes in weather conditions.

However, the author admits freely that the thesis put forward in this volume embodies few certainties and will occasion many doubts, and while his explanations are not entirely convincing, the detailed presentation of the facts leaves nothing to be desired, and on this account alone the work deserves warm commendation.

SURGERY OF CHILDHOOD.

By RICHARD WALTER BOLLING, M.D., F.A.C.S., Attending Surgeon, St. Luke's and Babies' Hospitals, New York City. London and New York: D. Appleton and Co. 1928. Pp. 390. 16*s*.

THIS book forms Vol. XV. of a series on clinical pædiatrics. The title of the volume is more comprehensive than its contents, since these do not include orthopædic subjects. There is thus no reference to talipes, congenital dislocation of the hip, or birth palsies, though 50 pages are devoted to fracture and epiphyseal separation. Joint tubercle has apparently been considered in Vols. VI. and VII., and hydrocephalus in Vol. V. We are not told where to look for a consideration of the tonsils and of mastoid infections; they receive scant notice in the volume under review. There are over 200 illustrations, and the X ray reproductions gain considerably by presenting the normal as well as the abnormal. This is a feature which might be widely imitated with advantage.

The book contains little that is new or provocative. Tannic acid in the treatment of burns and scalds is very properly advocated, but blood transfusion is advised for more conditions than most surgeons would consider necessary. A few of the author's opinions—e.g., those on appendicitis (p. 309)—are not generally held, but on the whole the book contains sound teaching. If it lacks balance and cohesion the fault lies partly in the scheme of producing units in a series of monographs.

PYODERMITES ET ECZÉMAS.

By Dr. R. SABOURAUD. With 149 original illustrations in the text. Paris: Masson et Cie. 1928. Pp. 284. Fr.60.

IN this work, the fourth of a series which includes previous volumes on seborrhœic dermatitis, squamous groups, and mycelial infections of the skin, the author presents a most comprehensive and careful study of the cutaneous coccal infections and their eczematous complications. Clinical photographs of typical cases, and many admirable microphotographs and diagrams depicting the actual causal organisms in situ, amplify the text and illustrate the immense scope of a subject which is here considered in three main sections, a fourth being devoted to treatment.

In the first section are described the various ways in which staphylococci can gain access to the skin; the frequency with which *S. aureus* is recovered on culture; the peculiar type of perifollicular abscess, the furuncle, and its necrotic sequela; Bockhardt's impetigo (which is not a streptococcal infection), and the consecutive alopecia sometimes noted in hairy regions. In the second chapter of this section the various forms of sycosis, nail infections and granuloma pyogenicum, due to *S. aureus*, are considered with a scrupulous regard for accuracy.

Section 2 is devoted to the streptococci. Impetigo is discussed in detail; intertrigo and its eczematous complications are then described, and eczema is considered from the bacterial aspect. It is admitted that the universality of the cocci and their low-grade specificity render all conclusions based on bacteriological findings vague and uncertain. The ætiology and nosological relationships of "eczema" are further elaborated in section 3. Some of the terms used, for example "eczematides," "coccides," introduce a finesse of diagnosis which makes a special appeal to the dermatologist, but which nevertheless has a practical bearing referred to later in the section on treatment. The study of this complex elaboration is much assisted by the photographs of actual cases, many of which recall the multiplicity of clinical types in which the author is striving to create some semblance of order, a task for which his famous treatise on the ringworm fungi has especially fitted him. The final section is a therapeutic synopsis of methods and formulæ of the old and well-tried French school. The lucid table of contents and a complete international bibliography are additional features in a most admirable production.

THE ULTRA-VIOLET RAYS.

Their Action on Internal Diseases and Use in Preventing Loss of Colour and Falling of the Hair. By ARNOLD LORAND, M.D. Vienna, Physician at the Carlsbad Springs, Czecho-Slovakia. Philadelphia: F. A. Davis Company. 1928. Pp. 258. $2.50.

THE title of the volume leads one to expect a study of the action of ultra-violet light on digestive, nervous, and ductless gland diseases. This has not been supplied; no effort has been made to study the action of light, apart from the many other methods of treatment employed, and no series of comparative cases is given. The statement is made here and there that better results were obtained when light treatment was superimposed on other methods, including gland extracts, iodine, mud-packs, and mineral spring water cures. The dosage employed is seldom stated in precise terms and the degree of erythema aimed at is not always given. The author attributes the reddening of the skin in strong sunlight to an irritation of the blood-vessels of the skin, and says that for this to occur the sympathetic (splanchnic) must positively be involved (p. 27). The book contains innumerable dogmatic statements for which no scientific proof is adduced. Dr. Lorand advocates light treatment as a means of lessening pain—e.g., by irradiation of the gall-bladder area in cases of gall-stones—and claims that the symptoms of old age are alleviated by the use of the mercury-vapour lamp; here, again, he does not limit treatment to ultra-violet light, but gives extracts of ductless glands and iodine as well (p. 95). The use of ultra-violet light for cosmetic purposes will hardly recommend itself to actinotherapists. The author states that after desquamation has occurred the complexion improves and that wrinkles disappear. It must be remembered, however, that mercury-vapour reactions are, as a rule, very painful, that turgescence of the skin is mostly transitory, and that this treatment may stimulate hair-growth in any irradiated part, not on the scalp only. The author's claim that light treatment is efficient in reducing obesity and in lowering blood pressure (apart from a small temporary fall) is not upheld by other investigators in this field; but since he uses light mainly as an auxiliary treatment, he is not really in a position to make specific claims for its efficacy. Several chapters are devoted to the subject of the action of light in stimulating hair-growth and to the treatment of greying hair, the work of Nagelschmidt in this field being duly acknowledged.

We have nothing but praise for the way in which the book is published; the clear type, the good binding, and light weight, are an achievement at the moderate cost of $2.50.

SPINAL NEURO-SYPHILIS.

La Syphilis Médullaire. By Dr. LORTAT-JACOB, Physician to the Saint-Louis Hospital, Paris; and Dr. POUMEAU-DELILLE, Interne of the Paris Hospitals. Paris: Masson et Cie. 1928. Pp. 151. Fr.70.

THIS volume belongs to the series entitled *Collection Médecine et Chirurgie Pratiques*, and contains in a concise form, for student and practitioner, present-day information on the varieties of spinal neuro-syphilis, their pathology, semiology, differential diagnosis, and treatment. Tabes dorsalis is excluded, for no very obvious reason; combinations of tabes with amyotrophy, with lateral column involvement, with incomplete transverse "myelitis" are not so infrequent as to suggest a fundamentally differing ætiology for parenchymatous as compared with interstitial manifestations, but the authors describe only the meningovascular types under the chosen title. A good account is given of acute and chronic meningomyelitis, gummatous forms, syphilitic muscular atrophy, and of rarer groups such as syphilitic combined sclerosis, and spinal compression of syphilitic origin. A place is found for "pseudo-tabes syphilitique" and "pseudo-sclérose en plaques syphilitique," although in our view these terms are misleading and should be abandoned. Neither of them should be characterised with the epithet "pseudo," for the former is merely a tabetic variety with overflow from the posterior funiculi, while the latter is a multiple, disseminated, syphilitic "myelitis." On the other hand, attention might have been drawn—since rarities are included—to the interesting combination of systematised posterolateral sclerosis with amyotrophy.

The purpose of the authors, however, is well served by this little vade-mecum.

GONOCOCCAL URETHRITIS IN THE MALE.

By P. S. PELOUZE, M.D., Associate in Urology and Assistant Genito-Urinary Surgeon, University of Pennsylvania. London and Philadelphia: W. B. Saunders Company. 1928. Pp. 357. 24*s*.

IN this small monograph Dr. Pelouze has produced an excellent summary of modern methods in the diagnosis and treatment of gonorrhœa in the male. Methods of culture and identification of the gonococcus are described; a feature of particular interest is the application of the action of the bacteriophage in the differentiation of the pathological urethral flora. Special attention is drawn to the need of employing a culture medium of correct hydrogen-ion concentration. In view of recent enthusiasm about the use of diathermy in the treatment of gonorrhœa, the survival of gonococci in the author's cultures after exposure to a temperature of 113° F. for 30 minutes, is noteworthy. In an admirable account of the pathological aspects of this condition, based chiefly on the classical work of E. Finger, Dr. Pelouze suggests that the spread of infection from urethra to epididymis is due to the passage of infected urine along the vas deferens. He comments on the low incidence of infection of the seminal vesicle in comparison with that of the epididymis and assumes that the former has natural immunity to infection. Surgical treatment for chronic infection of the seminal vesicles is advised only as a last resort. In the section on treatment, no new departures are recommended; neither

vaccines nor diathermy have yielded very favourable results in the author's experience, and the action of acriflavine and mercurochrome has proved disappointing. The main maxims set out are thoroughness in diagnosis and gentleness and patience in treatment.

The volume terminates with an excellent selection of typical case histories followed by the author's comments. Readers will find this small book both refreshing and stimulating, but some will be disappointed by the brevity of the practical details of technique in treatment.

MODEL ANSWERS TO QUESTIONS FOR MENTAL NURSES set by the General Nursing Council. By HECTOR MACPHAIL. London: The Scientific Press; Faber and Gwyer, Ltd. 1928. Pp. 273. 5*s*.

THIS companion volume to the author's well-known book, based on the questions set for the Medico-Psychological certificate, will be found equally useful by students. His skill in putting clearly and concisely the essential points required for the perfect answer is beyond praise. In the anatomical section there are, perhaps, rather more technical terms than are really necessary, and the phraseology of the answers is rather that of the medical student than that of the nurse. In the section on mental diseases and psychology this fault has been ably avoided. A few minor points call for criticism: the definition of seclusion on p. 227 has not been brought up to date; on p. 147 para. 11 has been reversed, making incontinence characterise fainting and not epileptic fits; and an answer on glycogen omits mention of its storage in the muscles; but, generally speaking, the book is remarkably free from errors, and so pleasantly written that it will be found an attractive aid to study.

THE RELATION BETWEEN LABYRINTH AND OCULAR MUSCULATURE.

Die Labyrinthreflexe auf die Augenmuskeln nach einseitiger Labyrinthextirpation. By Dr. R. LORENTE DE NÓ, Assistant in the Cajal Institute, Madrid. With 186 figures in the text and 22 plates. Berlin and Vienna: Urban and Schwarzenberg. 1928. Pp. 205. M.15.

THE work performed for Dr. Lorente de Nó's monograph has been conceived and carried out on a high level of scientific knowledge and skill. The book gives the reader an insight into the technical and other difficulties and complexities surrounding the investigation of the relation between labyrinth and ocular musculature, and is far from easy reading. Probably it is well that this should be so; Dr. de Nó is at pains to point out that in regard to the actual anatomical connexions of central labyrinthine structures ignorance is not by any means dispelled, and if this is true of morphology it is truer still of physiology. His book deals only with one aspect of labyrinthine function, yet it is based on uninterrupted researches during a number of years. The major portion is taken up with protocols of a large number of personal experiments, mainly on guinea-pigs, in which the labyrinth has been extirpated and ocular movements studied by a special technique. The author gives us a highly technical discussion of his own conclusions and of those of others, which is of interest mainly to the specialist, and which, moreover, embodies abstruse mathematical data with which few can be familiar. Incidentally, he is critical of certain findings as to the causation of decerebrate rigidity, and claims that his experiments are not in harmony with the teaching of Rademaker and others of the Magnus school. The monograph does not lend itself readily to summarisation, in view of its peculiarly technical character. Possibly its chief problem is that concerned with the quick phase of nystagmus; the author's experiments lead to the view that for the occurrence of this phenomenon the substantia reticularis of the pons must be intact and that its neurones must be in relation with the central nuclei of the labyrinthine system. He considers that both quick and slow components result from peripheral labyrinthine excitations, not, however, corresponding to separate end-organs; on the contrary, his opinion is that a peripheral stimulus starts a diphasic reflex from a given semicircular canal, comparable to the awakening of the scratch-reflex in the spinal animal by a single cutaneous impression.

CLINICAL GYNÆCOLOGY AND OBSTETRICS.

A Handbook of Clinical Gynecology and Obstetrics. By R. T. LA VAKE, A.B., M.D., F.A.C.S., Assistant Professor, Obstetrics and Gynecology, University of Minnesota. London: Henry Kimpton. 1928. Pp. 281. 18*s*.

IT is difficult to place this book into any definite category. It is not a systematic text-book, nor does it treat any definite part or aspect of gynæcology. The writer's object seems to be the correction of the perspective of the practitioner or student who has made a thorough study of encyclopædic text-books and is left "in a daze of countless facts and details arranged according to the demands of logical and complete exposition rather than according to practical importance." Granting that there is a class suffering from the consequences of encyclopædic study, the need for a corrective becomes obvious, and probably this book will serve as well as any other.

The book, then, is a medley of the author's teaching on those points of gynæcology and obstetrics—chiefly the latter—which he considers of clinical moment and on which he feels he has something to impart. Orderly arrangement is entirely absent. Part I. begins with gynæcological examination and diagnosis, and a chat on displacements follows; a diversion then occurs to pelvimetry and obstetrical diagnosis, and post-partum examination, after which we are switched back to gynæcological conditions considered on a pathological basis. Part II. is almost wholly obstetrical, the subjects apparently being taken in the order of their prominence in the maternal mortality list. It begins with sepsis, toxæmia of pregnancy, and hæmorrhage, after which follow obstetric operations, malpresentations, repair of birth injuries, post-partum care, and alleviation of pain in labour.

Much of the matter is excellent and the work throughout is eminently clinical and practical; the modification of treatment to meet the particular patient is emphasised. The book will interest and instruct those who are in the mood to browse here and there as their inclination may direct.

JOURNALS.

BRITISH JOURNAL OF CHILDREN'S DISEASES. Vol. XXV. July–September.—Dr. A. P. Cawadias contributes a paper on treatment of chronic polymicrobian colitis in children, in which he maintains that better therapeutic results would be obtained if the pathology of the disease were taken into account and a more thorough clinical diagnosis was made, especially as regards what Tendeloo calls the "constellation" of ætiological factors of the disease.—Dr. F. Parkes Weber records a case of temporary pulmonary œdema in a leukæmic child during a stage somewhat resembling aplastic anæmia. The patient was a boy, aged 14, suffering from lymphatic leukæmia of the undifferentiated cell type, in whom acute pulmonary œdema followed blood transfusion.—Dr. Hazel H. Chodak Gregory reports a case of splenectomy for purpura hæmorrhagica in a boy aged 7 years. When seen ten months after the operation he was in good condition. The spleen, which was enlarged and weighed 2¼ oz., was connected by dense adhesions with the anterior abdominal wall, which suggested some primary inflammatory lesion of the spleen and its covering peritoneum as a possible cause of the disease.—Dr. J. D. Rolleston describes a case of non-surgical subcutaneous emphysema in laryngeal diphtheria. The patient was a girl, aged

6 years, suffering from severe faucial and laryngeal diphtheria, who developed subcutaneous emphysema of the neck, face, and chest. Considerable relief followed tracheotomy, and recovery ultimately took place, though the emphysema lasted for 11 days. Rolleston could find only six other examples, a record of emphysema in laryngeal diphtheria apart from tracheotomy or intubation. The condition is probably due to the fact that, as the result of dyspnœa, pulmonary emphysema occurs, vesicles on the surface of the lung rupture, and air passes to the root of the lung and so to the mediastinum and neck.—Dr. Helen Mackay records a case of diabetic coma with subcutaneous emphysema in a boy aged 4 years. The emphysema appeared after about 30 hours' air-hunger and spread over the neck and upper part of the thorax. Recovery took place under insulin treatment.—In a paper on uræmic paralysis following scarlet fever, Dr. M. Shaw, who reports a case of his own, illustrates the rarity of cerebral palsy following scarlet fever by the fact that Rolleston could find only 75 cases on record up to 1927, including four which had come under his own observation. Shaw's case occurred in a boy aged 4 years who, in the fourth week of a mild attack of scarlet fever, developed nephritis followed by symptoms of uræmia and left hemiplegia. The child survived, but the paralysis persisted.—Dr. T. R. Aynsley records two cases of hemiplegia associated with extensive nævus and mental defect, similar to those recently published by Brushfield and Wyatt.—The abstracts from current literature are devoted to acute infectious diseases.

MEDICINE AND THE LAW.

An Unregistered Dentist.

The point in a case which came before the Chichester magistrates on Sept. 11th was whether the extraction of a tooth for a friend by an unregistered man constituted the practice of dentistry. Suffering great pain from toothache all night, a man named Pace went to his friend, Lewis Llewellyn, in the early hours of the morning on July 29th. Knowing that all the dentists were closed at that time of the day, Llewellyn extracted a tooth, and in endeavouring to extract another the tooth broke. Llewellyn was not in possession of the correct instruments, and he advised Pace to go to the hospital. From there he was sent to a qualified and registered dentist, and the remains of the broken tooth were extracted. The Dental Board of the United Kingdom took the case up, and Llewellyn was summoned for practising dentistry without being registered under the Dentists Act. Up to 1921 Llewellyn had been engaged in dental practice on his own account in Swindon. He did not register as a dentist when the Act of 1921 became operative, as he was then under 23 years of age; and he told the court that since the Act he had extracted only one tooth—that of Mr. Pace. The magistrates found that a technical offence had been committed, but they recognised that Pace went to his friend in great pain, and Llewellyn made no attempt to evade the law, but simply tried to help his friend. Furthermore, Llewellyn, when he found he could not do all he wanted to do, sent his friend to a dentist. The magistrates dismissed the case, ordering each side to pay its own costs. The mayor cautioned Llewellyn, telling him to be wiser in the future in regard to such matters. At the outset of the case a request was made that the mayor, Dr. A. H. Bostock, the presiding magistrate, should not sit on the bench, as the Act of 1921 was passed largely through the instrumentality of the medical profession, but after consultation Dr. Bostock intimated that it was the opinion of his colleagues on the bench that it would be quite fair for him to remain there.

Coroner and Jury's Courage.

The newly appointed coroner for East Sussex, Dr. E. F. Hoare, had something to say at an inquest at Chailey on Sept. 18th on the habit of juries coupling with their verdict of suicide the words, "while of unsound mind." In this case the inquest was on a man aged 43. The widow stated that her husband had often threatened suicide and worried a good deal when he was out of work. About a month ago she found a tin of rat poison in his bag, and fearing that he might use this poison on himself she asked a nephew to bury it in the garden and this was done. The man bought an ounce of prussic acid and signed the poison book, saying that he required the acid for killing wasps. Later he was found under a hedge on his allotment, the cause of death being cyanide poisoning. At autopsy the condition of his viscera appeared to be perfectly healthy, and there was nothing in the state of the body to suggest a motive for the act. Summing up, Dr. Hoare made the following comment: "The point is, is there anyone who saw the man take the prussic acid? I was present at the post-mortem examination and the body was full of cyanide poisoning. The fact that it was found on his body and in his stomach points to the fact that he took it himself. The other question to consider is in regard to the state of his mind at the time. This is not very clear. His wife states that he had talked about committing suicide and thought he was likely to do it. Before you return your verdict I would like you to realise that the mere fact that a person commits suicide does not mean you have got to say he was of unsound mind. Juries are rather apt to do that. You must be convinced there is some evidence of unsound mental balance before the act was actually committed." After a short consideration the jury announced a unanimous verdict of "Suicide" only, to which the coroner replied: "I think you are perfectly right. One must have evidence of definite mental trouble before insanity is mentioned. I am very glad you had the courage to stick to your verdict. Unless you have evidence you must not assume. I congratulate you on the courage you have shown."

Dangerous Drugs Acts: A Doctor Prosecuted.

It is a legal maxim that nobody is allowed to excuse himself by pleading ignorance of the law. In certain cases, indeed, the courts may expect special knowledge of the law. For instance, a medical practitioner would presumably be expected to know more about the Dangerous Drugs Acts and Regulations than a shoemaker or a plumber. At a recent prosecution at the Tower Bridge Police-court (on a charge of having failed to enter in a register the particulars of the purchase of certain quantities of morphine sulphate on certain dates) it was somewhat unfortunately urged on behalf of the defendant doctor that the practice of the medical profession was extremely lax in these matters, and that the defendant did not realise what the regulations implied. This kind of plea, which the magistrate entirely declined to accept, does no service to the medical profession as a whole, since existing arrangements for the enforcement of the law are based upon the loyal coöperation of the members of that profession. Nor did it assist the particular defendant since, at a later stage of the proceedings, statements were made by the prosecution which appear to have established something more than mere laxness. A representative of the Director of Public Prosecutions informed the court that the defendant had been convicted earlier this year as a drug addict. A detective-inspector mentioned a previous charge in April last of stealing 100 tablets of morphine sulphate. It was stated that last June the defendant was sent to a home until he could be certified as cured, and that he had been released under the Probation of Offenders Act. Fortunately the magistrate found a lenient course possible. On the defendant's partner undertaking to look after him, the defendant was remanded for three months on his own and one other surety in £50 each. This should mean that, if there is no further infringement of the law, there will be no further punishment.

THE LANCET.

LONDON: SATURDAY, SEPTEMBER 29, 1928.

RHEUMATIC HEART DISEASE IN CHILDHOOD.

RHEUMATIC carditis is now recognised as a crippling and fatal disease, of which the complete cure is so rarely achieved that efforts are being centred chiefly on its prevention. In his Lettsomian lectures, the last of which we publish to-day, Dr. F. J. POYNTON makes a weighty contribution to this campaign. He has much to say that will encourage all who are working at the rheumatic problems of childhood, but at the same time he leaves a sobering impression that though the subject has been intensively studied for many years, the gaps in our knowledge are still so wide and formidable as to hinder forward progress. As regards the predisposing causes of the disease, he believes strongly in a hereditary factor and in a nervous element, but also that there may be other causes, endocrinological and dietetic, which have not yet been sufficiently explored. His attitude towards tonsillectomy is hesitant rather than sceptical. "It seems clear," he says, "that the tonsils must destroy infection, but the difficulty is to ascertain when they cease to act as a protection and become a danger." Evidence upon the occurrence of first attacks of rheumatism in children who have already had the tonsils enucleated is being accumulated on a large scale, and its publication is anxiously awaited by Dr. POYNTON, since the standardisation of current practice must depend on the frequency with which such attacks occur. The influence of damp is less to be feared, in Dr. POYNTON'S experience, than that of sudden atmospheric change; in large towns dry weather is held to predispose to dust-formation and sore-throats, and so to rheumatic infection. Dr. POYNTON deprecates the exhibition of salicylate of soda in large doses to frail rheumatic children; in his hands, tolysin, a cinchonic acid preparation, has proved an important addition to the scanty number of drugs which influence the rheumatic infection and is not toxic. The results of "sanatorium" treatment given in the home for heart cases in Sussex, recently transferred to West Wickham, are encouraging. The late effects of prolonged convalescence in this home correspond with those published recently by the Ministry of Health [1]—about two-thirds of the cases investigated after return to their homes were found to have maintained the improvement in their condition.

One of the most difficult problems for the clinician is to know when an attack of rheumatic carditis is over, that is, when the healing of the necrotic areas in the connective tissue of the myocardium is complete. Since it is extremely rare for death to take place during the earliest phases of the illness, pathological material for the study of this problem in prognosis is scanty. One has only to imagine the picture of early tissue-necrosis and attempted healing going on side by side, as caseation and fibrosis go on side by side in the tuberculous lung, to realise the difficulty of estimating the stage of the disease in the living subject. Add to this the uncertainty as to the method of primary invasion of the body by the infective agent, and the outcome is that we know depressingly little about the pathology of the condition. Dr. POYNTON tells us that 25 years ago Dr. ALEXANDER PAINE, his co-worker, and himself prophesied that the great battle of causation would be fought not over acute rheumatism but over malignant endocarditis, and he still holds that malignant endocarditis will prove the key to the situation. In this affection there can only be the two alternatives, either the rheumatic infective agent develops a great virulence and overwhelms the defences, or it has prepared the way for other infections. Dr. POYNTON, holding as he does that a streptococcus is the cause of acute rheumatism, naturally sponsors the former view, and, arguing from actual cases where micrococci have been obtained from patients with rheumatic carditis, states that the important question for the future treatment of heart disease is whether or not there is a malignant type of rheumatic endocarditis. If there is, the cause of acute rheumatism is known at once, but if not, how, he asks, are we to explain the frequent association of streptococci with rheumatic lesions? Against the theory of a secondary infection he claims that though the septic infections of childhood, such as tonsillitis and otitis, should give ample opportunity for attack on damaged valves, yet malignant endocarditis is exceptional in the child. Incidentally he notes that after attempts over a period of 20 years to treat rheumatic heart disease by vaccines or sera he has never succeeded in obtaining results good enough to justify any clear statement, and in malignant endocarditis his experience of vaccines has been "one uniform record of complete failure in both child and adult, used early or late, in combination with sera or separately, autogenous or stock, simple or complex."

Dr. POYNTON considers the pathological lesion in mitral stenosis to be of a different type from the ordinary rheumatic tissue-necrosis and tissue-repair, in that the process of fibrosis is slower and more subacute. Since this lesion is by far the most serious valvular lesion resulting from cardiac rheumatism, by reason of the actual obstruction it presents to the circulation and also of its close association with auricular fibrillation in later life, it is satisfactory to find the process of its evolution considered as a separate subject. If the development of mitral stenosis in the young could be by any means prevented, the late results of rheumatic disease would be less terrifying. Dr. POYNTON emphasises the significance of dilatation as the earliest sign of cardiac disease, and like the late Dr. D. B. LEES, the importance of the light form of percussion. He values electrocardiographic methods and considers that disturbances in rhythm are probably the result of focal lesions in the connective tissue framework of the heart in the region of the bundle of His. This attitude is in direct opposition to the views of the late Sir J. MACKENZIE on the youthful types of irregularity, extrasystole, and sinus arrhythmia. The presence of sinus arrhythmia, according to Dr. POYNTON'S school, does not signify that the heart has escaped infection. This is fortunate if there is any truth in the view held by some that a return of the respiratory variation in the heart-rate signifies a quiescence of cardiac infection in the rheumatic heart.

[1] Reports on Public Health and Medical Subjects No. 44.

MODERN PROBLEMS IN NEUROLOGY.

ENGLISH neurologists are little given to the writing of systematic books, but on rare occasions we are able to welcome collections of papers by them issued in book form. To Dr. S. A. KINNIER WILSON we are now indebted for a group of selected contributions on the neurological problems which have particularly engaged his attention in the last few years. The first third of the book [1] is devoted to the problem of epilepsy—or "The Epilepsies," as Dr. WILSON prefers to say; the second to the problem with which the writer's name is particularly associated, that of the diseases of the corpus striatum; and among the remaining chapters we find one devoted to a third great problem, the nature of certain disorders of sensation. The problems of epilepsy, using the word in its widest sense, have of late years been engaging the concentrated attention of English specialists, and their activity has frequently been reflected in our own columns; among their more noteworthy contributions Dr. JAMES COLLIER'S recent Lumleian lectures [2] and Dr. GORDON HOLMES'S Savill Memorial oration [3] rise to our minds. The English school of neurology has behind it the greatest contribution ever made to the knowledge of this subject, HUGHLINGS JACKSON'S discoveries and teaching in regard to the forms of attack which have since borne his name, and Dr. WILSON reverts frequently to HUGHLINGS JACKSON as to the fons et origo of all modern knowledge in this department. In the articles now reprinted his own analytical mind has concerned itself chiefly with the most basal problems of the subject—what constitutes a fit? the type of movement in a general fit, the numerous variants of epileptic attacks, the inhibitory elements which form part of every attack and seem to form the whole of certain attacks, and the essential unity with epilepsy of the peculiar symptom called narcolepsy.

Of the chapters referring to diseases of the corpus striatum the keynote is restraint. Since Dr. WILSON gave the original description of the syndrome of the corpus striatum in 1912 there has been a widespread tendency to add to the syndrome and very varied disturbances of movement and of speech and writing have been attributed to disorders of one or other part of the basal ganglia. But these ganglia are of simple structure and therefore most unlikely to have multiplex functions. Critical judgment and experimental methods applied to some of these symptoms show that it is unjustifiable to ascribe them to striatal dysfunction, and the narrow limits which Dr. WILSON still sets to the functions of the corpus striatum will, we imagine, surprise many of his colleagues abroad. "The main features of disease of the corpus striatum consist of disorder of muscle-tone regulation, and appearance of involuntary movements." "Disease of the strio-spinal system . . . allows rigidity and hyperkinesis." The author, who speaks with authority in this department, sees no reason to add to these.

The third great problem in neurology which this stimulating book raises is that of the nature of certain subjective sensory disorders associated with organic lesions. In the chapter entitled "Dysæsthesiæ and their Neural Correlates" (the title smells of brimstone and the black art!) the philosopher in the neurologist is at his best. "Dysæsthesiæ" includes all subjective disorders of sensation, such as "burning," "tingling," "deadness," which seem to arise spontaneously. After a brief preliminary discussion, including a short consideration of the nature of pain, the dysæsthesiæ associated with lesions at the various neural levels are described. Since these abnormalities are conscious sensations the afferent paths from the sites of the lesions to the "perceiving cortex" must be open, and the latter must be intact. Their pathogenesis may be attributed either to stimulation and excitation at the site of the lesion—in many ways the simplest theory, or to the withdrawal of the influence of a postulated inhibitory sensory system—a view which presents many theoretical difficulties as yet, but to which further evidence may bring more support. Another pathogenic factor may be lesions either of the sympathetic nervous system or of the vascular system. Cases of peri-arterial sympathectomy furnish evidence pointing to the modification of certain sensory disorders by operation on arterial nerve-plexuses. Thus under certain circumstances a neural origin, under others a vascular or sympathico-vascular origin underlies the manifestation of dysæsthesiæ in consciousness.

The presentation of these papers in permanent and accessible form is the more fitting inasmuch as the writer possesses, in a degree uncommon among medical authors of our time, a gift for putting his contributions into literary shape.

[1] Modern Problems in Neurology. London: Edward Arnold and Co. Pp. 364, with 56 illustrations. 21s.
[2] THE LANCET, 1928, i., 587, 642, 687. [3] Ibid., 1927, i., 957.

THE COMMON COLD.

EVERYONE has had, is having, or shortly will have a common cold, and, if we follow the advice of Prof. LOVATT EVANS given at the recent meeting of the British Association, we shall not seek to know why it is so—that, he says, is the province of the philosopher; what we want is a brief statement of the way of a cold, and this, in spite of almost universal personal experience, is what we lack. The natural history of diseases which strike occasionally and disappear for a time has in many cases been worked out with care. The common cold is so swift and prolific that, like the drosophila for problems in genetics, it might well serve as the type object of epidemiological research. The new conception of epidemic genesis recently set out by Dr. C. A. GILL, director of public health for the Punjab, in a book reviewed on another page, may stimulate inquiry into the way of a cold, for the gist of what he calls the quantum theory is that all epidemic manifestations are essentially dependent upon loss of equilibrium between infection and immunity—upon what LOVATT EVANS would call maladaptation. And GILL'S theory is all the more applicable to the common cold, for he attributes great prominence in the genesis of epidemics to meteorological conditions. During their passage from one human host to another, he writes, parasites are exposed directly or indirectly to the influence of meteorological conditions, a factor which may well be potent, even though the host as well as the parasite is susceptible to atmospheric changes. We are, as it happens, in possession of some recent information as to the extent to which disturbance of the body heat may be considered as the primary cause of commensal infection. The inquiry is by Dr. J. J. VAN LOGHEM, professor of hygiene in the University of Amsterdam, who has made a special study [1] of the borderline between parasitism and commensalism, the commensal organism being one that lives on the surface of the skin and mucous membranes and only causes disease under special circumstances which weaken the physiological defences. There are previous data bearing on the point. GREENWOOD and YOUNG in this country have found temperature to be the meteorological

[1] Journal of Hygiene, vol. xxviii., No. 1.

factor most closely associated with the mortality from respiratory disease. Dr. VAN LOGHEM also quotes an analogous result from a study by SCHADE of the German Army in time of peace which showed a parallelism in the rise and fall of "disease through cold" (affections of the skin in consequence of freezing), and of respiratory diseases. The direct research into the minor respiratory diseases conducted by the Public Health Service of the United States has also shown the synchronous occurrence of these diseases in various parts of North America.

Dr. VAN LOGHEM'S own research in Holland lasted 37 weeks and the final data covered 6933 persons. His informants were mainly heads of families of the more intellectual classes. A weekly list of questions demanded for each member of the family simply a no (no new cold) or yes (caught cold), and in case of colds the further statement—nose cold, sore-throat (angina), hoarseness (laryngitis), cold with cough (bronchitis), or slight influenza. No inquiry was made about serious diseases. The weekly percentages of colds in seven geographical groups showed a roughly similar course as regards major variations, and this similarity became more evident when the data were put into two groups only—Amsterdam and the rest of Holland. Roughly the same course (with the exception of a high initial September peak in the colds) was found in the ten-daily average of the outdoor temperature, inverted so that the peaks were peaks of cold. This disparity the author explains by the fact that the nights were then very cold—a fact marked in the averages by the warmth of the days, thus indicating that not only a general drop but also a large variation in temperature in the 24 hours may go hand-in-hand with colds. Weekly deaths from pneumonia for the Netherlands also showed a course following roughly—though with a lag—the course of both the temperature and the "colds incidence" line, agreeing with the former more closely than the latter especially in the absence of the high September peak, but differing from both in having a very sharp rise in March and April. Mortality from "old age" in the Netherlands for the same period showed a similar parallelism with outdoor temperature, but unlike pneumonia had no March-April rise. The specific cause underlying this peak in the pneumonia deaths, however, was suggested by a corresponding peak in the influenza deaths for Holland. Of the five types of colds classified in the colds inquiry, coryza largely outweighed all the rest, the courses of coryza and bronchitis were almost exactly parallel, angina and laryngitis showed the same tendency but on a smaller scale. Influenza at first followed the colds and then took its own course, having its highest peak much later in the period, corresponding to the late peak noted in the mortality for the country both from influenza and pneumonia. From these results Dr. VAN LOGHEM concludes that during the period there were two important causes of pneumonia—disturbed thermo-regulation, more potent in the first part of the period, and influenza, more potent in the second. He thus places influenza in a different category from diseases resultant on catching cold or commensal infections such as cold, pneumonia (in part), and old age mortality, and describes it as "a parasitic infection which in a period of catching cold easily gets entangled with pneumonia." He concludes that an important part of the respiratory diseases is based on infection by commensal microbes which occurs after the physiological defences have been weakened by a disturbance of thermo-regulation, and that commensal infection may thus lead to parasitic infection to which healthy persons may fall victims by contagion. Dr. VAN LOGHEM then sought from his data evidence as to the contagiousness of colds. He argued that if colds were contagious small families should have a lower incidence than large families. On dividing his families into two groups according to size, he found the difference in incidence negligible. This part of his analysis carries less weight, for the average difference in family size is small, and might even with fairly high contagiousness be outweighed by opportunities for infection outside the family. Families even where there are small children are not isolated units, and contact with the outside world is generally too close for us to do more than agree with the author's first comment that nothing has been proved by this of the contagiousness of colds. To test the disturbance of the heat-regulating powers of the body by outside cooling Dr. VAN LOGHEM obtained the rectal temperature of 33 children at 3.30 A.M. and 4.30 P.M. for 26 days, and found some conformity between the former and the open-air temperature at midnight—not a very striking correlation if we are right in estimating it from the published graph at $0{\cdot}19 \pm 0{\cdot}13$.

There is room for much more work on the lines of this study. His subjects had an average of over four colds per person in the 37 weeks—a frequency which, as we have said, makes it a hopeful subject for investigation. Such observations might be increased both in scope and in detail. Dr. VAN LOGHEM'S views on the active and passive means of keeping up the body-heat level may be a little one-sided. The observed facts can tell us of the association of environmental factors such as temperature with the incidence of disease, but assuming a real basis of causation in this association, the manner of its working is not self-evident. The paradox that cold may work inversely by means of heat needs some consideration, and there is nothing in the Netherland results to contradict the conclusion to which the work of LEONARD HILL leads, that cold weather may bring about a large crop of colds through people being more inclined to shut themselves up in warm stuffy rooms and to open fewer windows.

A COURSE will, as usual, be held at St. Mary's Hospital, London, during the week-end preceding the autumn session. The meetings will be in the library of the medical school and will be open to all medical practitioners without fee. They begin on Saturday, Oct. 6th, at 11 A.M., with a lecture by Dr. Reginald Miller on the Intestinal Child, after which Sir William Willcox will speak on Food Poisoning and Paratyphoid Infections (noon), Dr. A. Hope Gosse on Prognosis in Heart Disease (2.15 P.M.), and Mr. R. M. Handfield-Jones on Recent Advances in Everyday Surgery (3.15 P.M.). On Sunday the first lecture will be at 10.15 A.M. when Mr. Aleck Bourne will speak on the New Ovarian Hormones, followed at 11 A.M. by Dr. C. M. Wilson on Some Common Difficulties in Diagnosis, and at noon by Mr. Zachary Cope with a demonstration of clinical cases and pathological specimens. On Sunday afternoon there will be no lectures, but the course will be continued throughout Monday, Oct. 8th, Mr. Duncan Fitzwilliams starting at 11 A.M. with an account of the Use of Radium in Malignant Disease. Prof. C. A. Pannett will lecture, at noon, on Some Surgical Obsessions and Dr. John Ryle at 2.15 P.M. on the Nature and Relief of Some Common Gastric Symptoms. Mr. T. G. Stevens will conclude the series with an address, at 3.15 P.M., on Some Pitfalls in Obstetrics. Those who have attended former courses of this kind will need no recommendation to attend. The popularity of the lectures is a welcome indication of the need felt by practitioners to keep their knowledge up to date.

Annotations.

"Ne quid nimis."

WOMEN IN MEDICINE.

WHILE London University is considering the facilities provided in the London schools of medicine for the education of men and women students respectively, various women's organisations have set up a joint committee to promote equal opportunities for women with men in the medical and hospital services. The latter have now issued a leaflet setting out the facts as seen by them regarding (1) the training of women medical students in London, (2) equal opportunities of hospital appointments, and (3) women on hospital boards of management. It was of course during the war years, 1914–18, that women came into their own in the opportunities for making a medical career. For a time seven of the 12 medical schools of the University of London were co-educational and some of them apparently intended to remain so. This high tide has ebbed as might have been prophesied, and the periodicity of its flow is difficult to determine. There is a perhaps not unnatural tendency to regard the situation as having settled down, like the price of houses and the ratio of unemployment, to what may be regarded as normal conditions. But probably in all three respects it is too early to speak of a norm at all, although the entries of medical students of both sexes are not unlikely to fluctuate fairly close to the standard of 500 each for England and Scotland and 200 for Ireland. The women's memorandum, however, envisages a general tendency towards a steady increase in the demands for the services of medical women as time goes on. First and foremost, there is an increased demand for women to fill posts in child welfare and maternity clinics, school inspection, and the like, under local authorities. There is the probability—the memorandum regards it as a practical certainty—that within a few years national health insurance will be extended to cover dependent wives and children, or, if not, a health service covering these classes will be set up, and in either case there will be greater need for the advice of women doctors. Apart from these special occasions, the memorandum speaks of a steadily growing demand for women doctors spreading from the more to the less educated women as the latter begin to realise the possibility of employing doctors of their own sex. It is suggested that women are still often deterred by scruples of delicacy from submitting themselves to medical examination by a male practitioner until the time has gone by for the recognition of such serious diseases as cancer. The growth of population in and around London, and the increased demand for doctors in India and the Far East, are also regarded as likely to augment women's entry to the medical profession. Finally, there is the economic reason, very frankly stated in the memorandum, that the financial condition of the professional classes at the present time makes it especially desirable for them to seek careers for their daughters; and where should a more suitable career be found than in medicine? These are the reasons why, in the opinion of an influential body of women's organisations, the growing need of facilities for the medical education of women in London should not be overlooked.

OSSIFICATION.

FOR generations the problems of calcification and ossification have been the subject of inquiries and research. Anatomists, embryologists, physiologists, pathologists, and chemists have contributed views on some one or more of the questions concerned, and certain facts have emerged from the theories and fancies to gain general acceptance. It is usually held that calcification precedes ossification, whether cartilaginous preformation is present or not, and that the calcified area is destroyed in the course of the osteogenetic process. Osteoblasts and osteoclasts have also been in the picture for many years, the former being concerned in some way with the deposit of the bony material, while the large, usually multinucleated cells known as osteoclasts are held responsible for the removal of bone where necessary. It must be admitted that the powers claimed for these cellular bodies are not based on incontrovertible evidence, and some observers have not hesitated to deny them. For example, Drs. R. Leriche and A. Policard, who, after some ten years of research in collaboration, have produced their results in a book [1] which does not seem to have attracted the attention it merits, attempt to discredit the osteoblast and belittle the osteoclast. These authors have arrived at many conclusions which are not in accordance with commonly accepted ideas. For example, in discussing the preliminary stages of ossification, they suggest that the physiological value of the connective tissue basis of bone is in inverse ratio to its histological differentiation. The higher the degree of complexity of the pre-osseous framework the less dense is the bone formed. To illustrate this thesis, bone is aptly compared with reinforced concrete, the steel skeleton representing the connective tissue fibrils, while the cement corresponds to the calcified matter. They believe that there is no relation between osteogenesis and the presence of osteoblasts, which are held to be osteolytic elements, albeit of a feeble power. Their appearance is held to be a reaction on the part of the cellular elements to the pre-osseous changes occurring in their midst. The osteoclast is not, according to these workers, a cell of specific origin; it may arise from fibroblasts, osteoblasts, or endothelial cells. Its action is phagocytic; osteoclasts have been observed in the process of enclosing fine spicules of bone in areas where absorption is taking place. The view expressed by Kölliker that osteoclasts may change into osteoblasts finds no favour; disintegration and disappearance of these elements seems to Leriche and Policard to be a more likely fate. The resorption of bone is not, according to these observations, a cellular phenomenon, and the rôle of the osteoclast may be of minor significance. The process of halisteresis is considered from a biochemical aspect. As to the periosteum, Leriche and Policard range themselves with Macewen in holding that it does not possess any specific osteogenic function. It limits bone growth, but also by virtue of its proximity to the bone-forming elements it favours ossification. The authors describe an ingenious method of experimental production of bone in the skin in man, and discuss the mode of formation of bone in unusual regions. Finally, an attempt to apply to pathology and surgery the general laws of ossification is stimulating and suggestive. Nevertheless the work is not altogether convincing. Especially in regard to the osteoblasts and osteoclasts it is difficult to accept their conclusions. Most embryologists will hold that the status of osteoblasts and osteoclasts remains more or less unimpaired. The older view of the preliminary calcification, that it was a deposit of lime salts in a non-living or extra-cellular tissue or medium, an inter-cellular substance, has now given way to the better founded conception of the exoplasm, an outlying part of a cell, in which the deposit takes place. It is in this material that fibrils make their appearance before calcification; fibrillation, due probably to the linear arrangement of cytoplasmic granules with a covering of adsorbed colloidal material, is a function of living protoplasm. Calcification, then, occurs during the life of the area involved, but it is nevertheless a sign that this life is at a very low ebb. Ossification, on the other hand, is an indication of exuberant life, a sequence of new circulatory invasion, entailing of necessity the clearing away of the calcified debris which preceded its advent. Embryological examination shows very clearly this

[1] Les Problèmes de la physiologie normale et pathologique de l'os. Paris: Masson et Cie.

association of ossific centres with vascularity, and the way they destroy and replace the practically non-vascular calcified area. These matters were well brought out in THE LANCET of Sept. 8th by Prof. H. A. Harris writing on Bone Formation and the Osteoblast. Readers interested in the questions from a pathological or morphological standpoint will find this paper of considerable reference value. Dr. Harris says truly that we wait for the chemist to explain the colloidal processes which lead to the deposition of calcium in two tissues so fundamentally distinct as dying cartilage and living bone. It does not seem that the anatomist and the embryologist can advance much further without some widening of the horizon. The modern view of living substance compares it with a reversible colloid, and researches along the lines indicated by such a comparison, researches dealing with suspensions and emulsions and the effects on them of various salts, will without doubt open up new avenues along which the investigator of ossification will be able to progress. There will still remain a vital activity (in the form of cellular regulating processes) which will be outside the chemist's province, and it is in the elucidation of this process that the opportunity of the experimental embryologist will come.

CHILD WELFARE IN JAPAN.

WRITING from the laboratory of the University medical clinic at Kyoto, Dr. Teruko Minouchi describes[1] the development of infant and child welfare in Japan. She points out that the changes which have taken place in this country within the last 60 years, while they represent an enormous advance in energy and culture, seriously threaten the health of the people in several directions. A special feature in the industrial life of Japan is the greatly increased ratio of female to male workers, especially in the case of the textile trades which form the most important industry of the country. The ill-health of the women is increased by the fact that the girls begin to work while very young and undeveloped. The author briefly sketches the growth of infant welfare in Japan from its earliest beginning 1400 years ago down to the present day. In spite of this long period, however, the infant death-rate in Japan in 1924 was more than twice that of England and Wales, and three times that of the Netherlands. Dr. Minouchi is convinced that progress in maternity and child welfare will depend largely upon the development of the women's movement, and she urges that women should take a larger share in public life and in the general activity of the nation if any progress is to be made in social hygiene. Dr. Minouchi's paper was presented to the open meeting of the Medical Women's International Association recently held at Bologna.

CONTROL OF INVALIDITY.

NATIONAL attention is being ever more and more directed to the importance of invalidity, to the economic loss it entails through national insurance, and to the industrial inefficiency thereby created. Few investigations have thrown more light on the causes underlying sickness, whether due to illness or accident, than one made among coal-miners by Dr. H. M. Vernon and Dr. T. Bedford.[2] Nevertheless, the subject is difficult; and, although records were studied relating to 23,000 miners for periods of 21 months to six years, and although the authors can point to the extraordinary sensitiveness of the miner to his conditions of work and general environment, yet the inferences suggested by the facts are only cautiously advanced. Some deductions seem definite. The most valuable method of reducing absenteeism which among coal-miners is considerable is to improve the conditions of work; thus air movement within a narrow range is associated with a minimum of accidents and sickness, and at moderate variations to lower or higher velocities the rates rapidly rose. Air velocities of only 18 to 21 feet per minute were found, and are condemned as too low for efficient work or for safety in mines rich in gas. The cause of absenteeism most studied was accident, the frequency of which, so far as minor accidents are concerned, varies with underground temperature. The grading is remarkable; accidents causing less than ten days' disablement were 4·3 times more numerous at the highest than at the lowest temperatures; those causing 10–19 days' disablement were 2·0 times more numerous; those causing 20–59 days' disablement were 1·5 more numerous; but major accidents causing 60 days or more disablement were unaffected by temperature. Generally what holds good for accident frequency also holds good for sickness rates. Undue exercise increased absenteeism; men who walked from the pit shaft to the coal face, 2800 yards, showed 58 per cent. more than men who walked 1330 yards; similarly, men who lived 2–6 miles from their colliery showed 80 per cent. more voluntary absenteeism than those living 1–2 miles away. Seasonal fluctuations naturally affected surface workers more than underground men. The outstanding conclusion to be drawn is the delicate way in which the human organism reacts to its environment; by controlling the environment its reactions can be advantageously controlled whether the reaction result in a traumatic or infectious "accident."

THE CEREBRO-SPINAL FLUID IN SYPHILIS.

WRITING on the cytology of the cerebro-spinal fluid in syphilis, Paul Ravaut and Raoul Boulin[1] say that dried fixed films made after centrifugation leave such a large proportion of the cells disorganised as to be valueless, whilst a simple numerical count may give no hint of a serious underlying pathological process, persisting after the cell count has almost reached normal figures. After many trials they favour vital staining with methyl-green pyronine, the deposit after centrifugation being mixed with the stain and the cover-slip ringed. Such a preparation lasts about 24 hours. Living cells may be distinguished by the fact that they take longer to stain, sometimes even hours, the nucleus eventually becoming blue and the cytoplasm and nucleolus red or rose-coloured. As a result it is claimed that the following types of cell may be distinguished: unattached nuclei, lymphocytes, medium-sized mononuclears, polymorphonuclears, large mononuclears, and plasma cells. The two last types are always of great importance as indicating involvement of the parenchyma of the nervous system, as opposed to meningitis. In secondary syphilis, a count composed of lymphocytes and medium-sized mononuclears gives a favourable prognosis under treatment; but if large mononuclear cells and plasma cells are also present, they may persist in spite of treatment, giving warning, perhaps years ahead, of involvement of the nervous system. Tertiary cases they divide into four groups: those with no clinical involvement of the nervous system, those in which only the cerebral vessels are affected, tabetics and cases of general paralysis. In the first two groups the same rules apply as in secondary syphilis, but the significance of an abnormal fluid is greater. In an early tabes lymphocytes and middle-sized mononuclears often predominate with perhaps a few small plasma cells, or the latter may form the majority. An old or arrested case may show very few cells, most of them dead, and polymorphonuclears are rare. It is often impossible to tell a progressive from an arrested case by the cells present because, though quiescent in the meninges, the disease may be active in the parenchyma.

[1] Die medizinischen Massnahmen zur Gesundsheitsfürsorge für Kinder, insbesondere Säugling und Kleinkind, und für Jugendliche in Japan.

[2] A Study of Absenteeism in a Group of Ten Collieries. By H. M. Vernon and T. Bedford. Industrial Fatigue Research Board. Ref. No. 51. H.M. Stationery Office. 2*s*. 8*d*.

[1] Presse Méd., July 14th. This paper summarises one appearing in the Annales de Dermatologie et Syphilographie for last December.

General paralysis has more definite characteristics. The cells often show great vitality and diversity of type and it is only in these cases that the large and polynuclear plasma cells are found. Lymphocytes and medium-sized mononuclears still, however, often form the majority of the cells present. Ravaut and Boulin claim that the technique is simple, but it is clear that a considerable experience would be necessary before the different types of cells could be distinguished with certainty, the more so as moist preparations are necessary. Confirmation of the results is also clearly necessary and this can only be obtained, as the authors have found, by years of comparison with clinical findings. But the importance of the spinal fluid as a guide to prognosis in secondary syphilis is now becoming recognised; and the assistance promised by the present work should not be ignored where there is enough material at hand to allow mastery of the technical difficulties.

QUESTIONING THE PATIENT.

No one will dispute the importance of thorough physical examination before diagnosis, but the stress laid upon it tends to relegate history-taking to a second place. The main reasons for a relative neglect of this fundamental part of the examination are nervousness or incoherence on the part of the patient, a preconceived idea of the diagnosis either on his or the doctor's part, and, most important of all, lack of time. The time available for a consultation has its limits, and it can only be used to the best advantage if patient and physician are prepared to assist each other. We have just received the second edition of a little book[1] designed to meet these difficulties and prepare the patient for consultation. It opens with a short preface in which the duties of the patient to the physician are explained, and emphasises especially the need for early consultation, so that tendencies to disease may be recognised before they become incurable, and the desirability of giving an accurate account of the symptoms themselves rather than of deductions and theories. This advice is followed by lists of questions arranged under various headings such as general information, family history, nutritional and digestive disorders, and respiratory troubles, which the patient, according to his complaint, can prepare himself to answer, in order that when the actual consultation arrives nothing will be missed and answers will be clear and to the point. There is no doubt that if this book were used intelligently history-taking would be made easier and more speedy. But there are great disadvantages in putting a book of this kind in the hands of patients. The people who most need such a guide are exactly those who would be most confused by the possibility of having to answer a formidable array of questions, whilst the suggestive effect of studying queries like, "Have you a very sharp pain which starts from the region of the heart and goes towards the left arm?" might be very unfortunate. The book may be useful to the physician in re-emphasising the value of a careful history, but in the hands of patients it would certainly give rise to more mistakes than are traceable to the surreptitious leading questions which a medical man must introduce into his catechism.

MALARIA AND COMPROMISE.

THE 33 members attending a session of the First Subcommission of the Malaria Commission of the League of Nations have issued a unanimous report on antimalaria methods.[2] The final aim of all measures directed towards the eradication of malaria is regarded as being an "integral bonification," which may perhaps be defined as the sum of economic, social, and hygienic betterment induced by development of the land and growth of civilisation. But by the very process of its attainment, bonification may temporarily increase malaria, so that in the meantime antilarval and other measures must be employed. Time is the essence of the contract for this as for all general antimalarial procedures, and unless adequate time be conceded adequate results will not be obtained. Time, too, is concerned in obtaining that "minimum effective degree of perfection" which must be reached before any individual antimalarial measure produces visible results. The most important of these is the treatment of the sick; it is the primary obligation, whose good results will, however, be apparent rather in the reduction of the severity of infection than of its incidence. In the choice of other intermediate methods which shall be employed in any particular local campaign, imitation of those which have already proved their value elsewhere is actually dangerous. Quite otherwise is the imitation of the confidence, energy, and perseverance which gave them their earlier success, and of the discernment which chose those measures which have proved applicable to each particular locality. In effect, this advice from the Subcommission implies the selection of an executive officer with wide knowledge and shrewd mind, who is allowed time in which his schemes may show their value. The report also emphasises how essential is the setting apart, in every country concerned, of special research workers; for very much still remains obscure in malaria, and antimalarial measures cannot reach their full effect till that shadow is enlightened.

HOUSING IN CITIES.

DURING the coming autumn session Parliament will have to review the position of the subsidy granted out of the national exchequer in order to expedite the supply of adequate housing for the existing population. The Minister of Health, who has the Rating and Local Government Bill on his hands, will no doubt be guided mainly by the experience of the public health authorities in the large urban areas concerned. Reports from medical officers of health of three industrial cities contain comments of moment on the local housing problems.

In Birmingham the City Corporation has since 1920 built 17,682 houses, the numbers for the years 1925–6–7 being 3066, 5159, and 4007 respectively. Dr. H. P. Newsholme remarks that while this steady progress is being made in the provision of new houses, the problem of housing continues to rank as one of the most urgent and fundamental questions confronting the city. Much is being done, through sanitary inspectors and in other ways, to improve the conditions, often deplorable, of the least satisfactory houses, but there is great need for more radical treatment of a large mass of mean houses spread through various portions of the city—houses which are dismal, dilapidated, insanitary, and lacking in elementary amenities. It is not possible, says Dr. Newsholme, to measure the loss to Birmingham arising from the effects of such surroundings, not only through their adverse effect on physical welfare, but far more fundamentally through their hindrance to any real fullness of life. The problem calls all the more strongly for a solution through the contrast between this old and insanitary property and the remarkable new housing estates which have sprung up so rapidly. It is to be hoped on the one hand that the proposals of the Government for facilitating slum treatment will mature quickly, and on the other that the rehousing scheme is approaching a stage at which the problem of the slums can be systematically attacked.

In Manchester a special report on housing was submitted by Dr. R. Veitch Clark to the City Council on Sept. 30th, 1927. Dr. Clark can give no real evidence of a reduction in overcrowding although there may be a tendency in that direction, and the increased proportion of cheaper houses in the present housing schemes is likely to hasten the tendency. There is no noticeable slackening in the demand for

[1] Comment consulter? By Léon Schekter. 2nd edit. Paris: Octave Doin (Gaston Doin et Cie). 1928. Pp. 170. Fr.15.
[2] League of Nations: Health Organisation. C.H./Malaria/121. London: Constable and Co.

houses to let, and much the greatest demand is for the A type of house, probably owing to inability to pay higher rents. The report also gives an estimate that about 69 per cent. of the overcrowded families waiting for houses of the A2 and A3 type are able to pay the rents charged by the corporation. An estimate is put forward that the housing need for the relief of present overcrowding and for the normal increase of the population up to Dec. 31st, 1936, is 21,650, and that, in addition, 26,000 houses are required to meet the demolition of those now below a reasonable standard of fitness. During 1927 4461 houses were built, 2240 of which were municipal. Another estimate in the report is to the effect that about one-third of the "lodger overcrowding" is caused by single and married lodgers over 50, who are frequently in receipt of old age pensions or rental allowances from the guardians. The total of these rental allowances is put at £38,000 per annum, and it is suggested that the corporation might provide small houses in the form of flats consisting of a living room and bedroom or of a combined bed-living room for tenants of this type, and thus relieve much of the overcrowding without extra cost to the rates.

In Sheffield, according to Dr. F. E. Wynne, the amount of overcrowding continues to be deplorable and houses unfit for habitation cannot be closed, because the tenants cannot be rehoused. During 1927 five unfit houses were closed and the tenants of three small areas, comprising 173 houses, were removed to one of the housing estates. There are 4000 families on the waiting-list for municipal houses, and only a very small number of the very numerous applications of a most pathetic description received at the office can be entertained. It is impossible to prevent undesirable conditions on the corporation estates arising from subletting. During the municipal year ended March 31st, 1928, 1897 new houses were certified, of which 723 were municipal. During 1925 and 1926 the new houses numbered 2178 and 2714 respectively. The Parliamentary return shows that since the subsidy was reduced in December, 1926, the cost of erecting houses of the parlour and non-parlour type has gone down quarter by quarter, and that for the quarter ended June 30th, 1928, the average reduction in cost for both types was £82. Further, subsidised houses are going up at the rate of 10,000 a month and building is proceeding at twice the pre-war rate. Little has been done as yet in slum clearance and nothing in the way of building houses within the reach of the poorer classes of wage-earners.

These three reports, then, concur in the view that we are now only approaching the most difficult part of the housing problem. All people of goodwill will share the hope that when Parliament tackles it all parties will unite in a whole-hearted effort to cope with a national emergency.

TREATMENT OF MIGRAINE WITH ERGOTAMINE TARTRATE.

THE most plausible explanation of migraine is that it is due to spasm and subsequent dilatation of cerebral arterioles. If this theory were correct and, further, if such vascular spasm were evoked by nervous impulses reaching the cerebral vessels by the sympathetic nerves, it might be hoped that migraine would be relieved by the administration of drugs possessing a paralytic effect upon the sympathetic nerve-endings. Such a possibility led Dr. Arnault Tzanck[1] to treat migraine with ergotamine tartrate, a drug which is credited with an inhibitory effect upon the sympathetic. Dr. Tzanck, in introducing his report on this treatment, comments on the ineffectiveness of numerous other therapeutic measures. The number of cases treated with ergotamine was small, but the results obtained were sufficiently encouraging to warrant its employment on a larger scale. The dose was 2·0 mg. of ergotamine tartrate daily by the mouth, an additional 2·0 mg. being given at the threat of an attack. After a time it was often found possible to reduce the dose to 1·0 mg. a day. Treated on these lines eight patients subject to typical recurrent attacks of migraine improved, the intervals between their attacks being lengthened from a few days to two or three months. It was sometimes possible to abort an attack by administering a dose as soon as the first symptoms appeared. Three other patients suffered from "a veritable status migrainosus," being hardly ever free from pain. Two of these were almost cured; the third abandoned the treatment. In a case of ophthalmic migraine the headache was almost completely relieved, but the ocular manifestations persisted, though in an attenuated form. Dr. Tzanck observed no ill-effects in patients taking as much as 60 mg. of ergotamine tartrate a month, but he recommends careful supervision on account of the reported occurrence of gangrene following the administration of this drug, an event which if true is difficult to reconcile with its reputation as a depressor of the sympathetic. Dr. Tzanck wisely refuses to draw any theoretical conclusions as to the cause of migraine from the success of ergotamine in its treatment.

[1] Bull. et Mém. Soc. Méd. des Hôp. de Paris. June 28th, p. 1057.

SPLENIC TUMOURS DUE TO FUNGI.

ATTENTION was drawn in these columns[1] some months ago to the evidence produced by Emil-Weil, Chevalier, and Flandrin, in France, to the effect that many cases of splenomegaly clinically of the Banti type are really due to a mycotic infection. Evidence that tumours of the spleen apparently malignant, even to the extent of producing distant metastases, may also be due to a mycelial infection, is now brought forward by the same authors.[2] They describe the case of a young man who suffered from 1920 to 1923 from progressive enlargement of the spleen, at the end of which time the organ was removed and weighed 62 kg. He made a good recovery, but in the following year developed a tumour of the occipital region, fixed to the bone, which ultimately attained the size of an orange. This disappeared under treatment with X rays, but its disappearance was associated with the development of symptoms of intracranial tumour. Relief was gained by decompression but the symptoms returned and death ensued in 1926, three years after the splenectomy. Examination of the spleen showed it to be filled with dense, firm tumour masses, and macroscopically a confident diagnosis was made of the "pseudo-sarcoma" of Letulle and Jacquelin. Serial sections, however, showed the tumour masses to be actually united into one, and microscopy revealed the presence of a dense fibrous stroma and of well-formed blood-vessels, both incompatible with the diagnosis even of a "pseudo-sarcoma." The actual tumour consisted of masses of lymphoid cells, with scanty larger cells, having two or more nuclei; portions of it showed hæmorrhage, calcification, and a plentiful deposit of iron pigment, such as was described by Gamna in his "hæmosiderotic" splenomegaly. Further examination revealed in these hæmorrhagic areas structures of a filiform nature which the authors believe to be the mycelial elements of a fungus; in some cases terminal organs which might be sporangia were detected. These supposedly mycelial elements stained poorly with hæmatein and did not take any other of the ordinary microscopic dyes—but they stained well with ferrocyanide and hydrochloric acid, giving the blue reaction of iron. So long ago as 1913 Dr. A. G. Gibson[3] demonstrated the presence of mycelioid elements in the spleens from certain cases of splenomegaly, and the present observations of Emil-Weil and collaborators, which bear upon the ætiology of Hodgkin's disease, should stimulate further research

[1] THE LANCET, 1928, i., 767.

[2] Le Sang, 1928, ii., 361.

[3] Proc. Roy. Soc. Med., 1913 (Med. Sect.), 7, and Quart. Jour. Med., 1914, vii., 153; see also J. Fawcett and A. G. Gibson, THE LANCET, 1928, i., 1171.

along the lines laid down by Gibson. The confirmation of his work so long after its performance, and by observers apparently unaware of his findings, must be regarded as highly significant.

SUPRARENAL APOPLEXY.

Dr. Felix Pearl and Dr. Harold Brunn,[1] of San Francisco, who describe a case in a man, aged 45, which has come under their observation, remark that hæmorrhage into the suprarenal gland, though not infrequently found in infancy, is a rare condition in the adult, only 20 instances of bilateral suprarenal apoplexy in adults having been reported since 1906. The ætiological factors suggested have been thrombosis, capillary emboli, congestive diseases, infections and toxins, diseases of the solar plexus, surface burns, and the hæmorrhagic diathesis. The cases have been classified by Arnaud into three types—peritoneal, asthenic, and nervous. Any combination of symptoms may form the clinical picture, but asthenia is the most constant and characteristic of all symptoms. Physical signs are usually of no assistance in locating the seat of the disease. There may be merely vague tenderness in the lumbar regions or epigastrium or abdominal distension as in the present writers' case. There is no pigmentation of the skin as in Addison's disease. The diagnosis has only once been definitely made before death, in a case reported by N. B. Foster in 1920, but the presence of severe abdominal symptoms, with few or no physical signs, in a patient who presents definite nervous manifestations, profound asthenia, and gradual decline of blood pressure, should suggest acute adrenal disease. The prognosis is hopeless in well-marked bilateral cases, but small hæmorrhages may be absorbed without sequelæ. Treatment of bilateral suprarenal apoplexy is usually unsuccessful. The best results are likely to be obtained by injection of normal saline, Ringer's solution, and extracts of adrenal cortex or whole suprarenal gland. Epinephrin is ineffectual. Although operation is of no benefit in well-marked bilateral cases, it may be the only hope where there is massive unilateral hæmorrhage and where death is likely to be due to severe hæmorrhage and shock rather than to suprarenal failure.

THE Royal College of Physicians of London will commemorate its benefactors on Thursday, Oct. 18th, when the Harveian Oration will be delivered by Sir Humphry Rolleston, at 4 P.M., in the large library. The annual sermon at the Church of St. Mary-le-Bow will be preached at 11 A.M. on the same day, and in the evening the commemoration dinner will be held in the College at 7.30 P.M.

OUR advertisement columns contain an official notice of the forthcoming election of two members to the General Medical Council, to represent the registered medical practitioners resident in England. A group of not less than 12 practitioners is entitled to nominate a candidate, and nominations must be delivered in proper form to the Registrar of the Council on or before Oct. 13th.

[1] Surgery, Gynecology, and Obstetrics, September, 1928, p. 393.

DONATIONS AND BEQUESTS.—A cheque for £1000 from an anonymous donor has been handed to the Glasgow Dental Hospital by a chartered accountant of the city.—Miss Martha Mills, of Nottingham, left £1000 to the Nottingham General Hospital for the endowment of a bed in memory of her brother-in-law, Morris Weisblum, and £100 each to Dr. Barnardo's Homes and the Nottingham General Hospital; £50 each to several other charities.—Mr. Miles Daniel Whitehead, of Kingstown, Co. Dublin, left £500 to the Drogheda Memorial Hospital at the Curragh, Co. Kildare, and £400 to Laura Hitchins, and the income for life from 800 shares in the Imperial Tobacco Co., with remainder to the Manchester Royal Infirmary if Laura Hitchins predeceased him.

OPENING OF THE LONDON MEDICAL SCHOOLS.

ADDRESSES AND ANNUAL DINNERS.

Charing Cross Hospital.—Prizes will be distributed at the hospital on Thursday, Oct. 4th, at 3.30 P.M., by Dr. Thomas Watts Eden. The annual dinner will be held at Gatti's Restaurant on the same day at 7 for 7.30 P.M., with Sir Herbert Waterhouse in the chair.

Guy's Hospital.—The session will begin on Tuesday, Oct. 2nd, but there will not be an opening ceremony.

King's College Hospital.—An introductory address will be given at the Medical School at 2.30 P.M. on Wednesday, Oct. 3rd, by Mr. Ernest Barker, professor of political science, in the University of Cambridge. Sir William Watson-Cheyne, F.R.S., will preside. The annual dinner of past and present students will be held at 7.30 P.M. on Wednesday, Oct. 3rd, at the Trocadero Restaurant, Piccadilly-circus, W., with Dr. B. R. Turner in the chair.

London Hospital.—The old students' dinner is to be held at the Trocadero Restaurant on Thursday, Oct. 18th, at 7.30 P.M.

London (R.F.H.) School of Medicine for Women.—An introductory address will be given at the school at 3 P.M. on Monday, Oct. 1st, by Dr. Andrew Balfour, whose subject will be the Tropical Field, its Possibilities for Medical Women.

Middlesex Hospital.—Mr. A. E. Webb-Johnson will deliver an introductory address, entitled the Enemies of Man, at the Queen's Hall at 3 P.M. on Tuesday, Oct. 2nd, after which Prince Arthur of Connaught will distribute prizes and Princess Arthur will present the Fardon Memorial medals. The annual dinner will be held at the Savoy Hotel on the same day at 7.30 P.M., with Prince Arthur in the chair.

Pharmaceutical Society of Great Britain.—On Wednesday, Oct. 3rd, at 3 P.M., an inaugural sessional address will be given by Mr. Reginald R. Bennett, chairman of the British Pharmaceutical Conference. A presentation of the Pereira medal will be made. On the same day, at 6.45 for 7 P.M., the anniversary dinner will take place at the Hotel Victoria, Northumberland-avenue, W.C. 2.

Royal Dental Hospital.—The dinner of past and present students will be held at 6.30 for 7 P.M. on Saturday, Oct. 20th, at the Trocadero Restaurant. Mr. G. G. Campion will preside.

St. Bartholomew's Hospital.—The old students' annual dinner will be held in the Great Hall of the hospital at 7 for 7.30 P.M., on Monday, Oct. 1st, with Sir D'Arcy Power in the chair.

St. George's Hospital.—The prize distribution will be held in the Board Room of the hospital at 3 P.M. on Monday, Oct. 1st, when an inaugural address, entitled Hydrocephalus: A Study in Phylogeny and Pathology, will be delivered by Sir John Bland-Sutton. The annual dinner will be held on the same day at the Hyde Park Hotel at 7.15 for 7.45 P.M. The chair will be taken by Dr. W. S. Fox.

St. Mary's Hospital.—The annual dinner of past and present students is to be held at the Trocadero Restaurant on Friday, Oct. 5th, at 7 P.M.

St. Thomas's Hospital.—The old students' dinner will be held at St. Thomas's House on Friday, Oct. 26th, with Mr. Edwin Francis White in the chair.

University College Medical School.—The session will open on Monday, Oct. 1st, when Sir Thomas Barlow, F.R.S., will give an introductory address in the Library at 4.30 P.M. The annual dinner of past and present students will take place at the Hotel Cecil on Friday, Oct. 12th, Surgeon Vice-Admiral Gaskell in the chair.

Westminster Hospital.—An inaugural address will be given in the Board Room of the hospital on Monday, Oct. 1st, at 3 P.M., by Mr. A. C. Powell, headmaster of Epsom College. Sir William Goschen will take the chair. The hospital dinner is to be held on the same day, at 7 P.M. for 7.30, at Gatti's Restaurant, Strand, W.C., Sir James Purves-Stewart presiding.

PRESENTATION OF WILLIAM MACKENZIE MEDAL.—This medal, given for valuable contributions to ophthalmology, will be presented to Dr. A. Maitland Ramsay at the Glasgow Eye Infirmary, on Tuesday, Oct. 9th, at 8 P.M., when Dr. Ramsay will deliver an address on the Importance of General Methods in the Treatment of Eye Disease.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

V.—THE INTERPRETATION OF REPORTS ON SPUTUM.

By S. Roodhouse Gloyne, M.D. Leeds, D.P.H. Lond.,
PATHOLOGIST TO THE CITY OF LONDON HOSPITAL FOR DISEASES OF THE HEART AND LUNGS.

(2)* Cellular and Bacterial Content: Unusual Substances.

Cellular Content.

The cells of the sputum are often difficult to differentiate, but when they can be identified they are helpful in diagnosis. The dominance of large squamous epithelial cells indicates a condition of pharyngitis or coryza. Polymorph cells in large quantities are, of course, found in any purulent sputum and are not diagnostic of any special disease. They can be found in small numbers in specimens of sputum which are not purulent. In uncomplicated phthisis they are, as a rule, not very conspicuous, and when they predominate point to secondary infections. Alveolar cells from the lung are not easy to distinguish; they predominate in pulmonary tuberculosis. Ciliated bronchial epithelium is most difficult to detect even with special methods of staining, owing to the fact that it readily degenerates when the ciliated processes become unrecognisable. Malignant cells cannot be recognised with any degree of certainty, though large cellular plaques of cells are often suspicious. It is sometimes stated that predominance of the lymphocyte is an early sign of pulmonary tuberculosis. In the writer's experience this is not so. A predominance of eosinophil cells is often found in true asthma. Saliva and mucus contain few cells.

The Bacterial Flora.

The tubercle bacillus, suitably stained by the accepted Ziehl-Neelsen technique, is easy to recognise when present in any considerable number. Difficulty arises when the bacilli are very scanty. In doubtful cases of pulmonary tuberculosis it is advisable to examine a fresh specimen of sputum daily for at least a week before being satisfied that they are not present. Much depends on selecting the typical "nummules" in the sputum for examination. If search by this method fails a concentration test may be made. Several drachms of sputum are mixed with an equal amount of 5–10 per cent. antiformin; the mixture is allowed to stand for 15 minutes or so until the sputum is disintegrated, and then centrifuged, washed with water, recentrifuged, and a film of the deposit stained by the usual method. Unfortunately the method cannot be applied to a large series of specimens at one time, as in the ordinary film examination for *B. tuberculosis*, and therefore time does not permit its use as a routine. The method is said to increase the positive findings for tubercle bacilli by about 1 per cent. A daily examination by the ordinary film method for a week is equally efficacious and less laborious where large numbers of specimens have to be dealt with. The presence of large numbers of tubercle bacilli does not necessarily signify an acute infection. Chronic cases in fairly good health often have many bacilli in their sputum. A report on the number of bacilli seen per field of the microscope is therefore not of great value. Moreover, the actual count is dependent on variable factors such as the thickness of the film. At one time much stress was laid on the presence of so-called involution forms of tubercle bacilli as an aid to treatment and prognosis. It is doubtful if this sign is of any value.

In uncomplicated phthisis the sputum contains very few organisms other than the tubercle bacillus, but in the late stages of the disease catarrhal infections may be superimposed, and then the secondary organisms are many and various. Non-pathogenic acid-fast organisms are sometimes met with in sputum, but they are generally readily distinguished from the tubercle bacilli by their shape, size, and arrangement, and by the fact that they are rarely alcohol-fast and do not resist treatment with antiformin. Such bacteria generally come from the nose or ear. In case of doubt recourse must be had to guinea-pig inoculation.

Three or four years ago pathologists were frequently asked to report on the type of pneumococcus in cases of pneumonia, prior to the administration of anti-pneumococcal serum, but of late the practice has much diminished—presumably clinicians are not satisfied with the results of the serum treatment. Three types of pneumococcus are recognisable by means of agglutinin or precipitin tests. Types I. and II. are most commonly found in uncomplicated pneumonia and type III. in the rapidly fatal cases. Hæmolytic streptococci are not uncommon in the purulent sputum of "influenzal" broncho-pneumonia and imply a serious prognosis. Organisms of the coliform group are common in the fœtid sputum of bronchiectasis and pulmonary abscess. *B. pyocyaneus* is found in the same condition.

In interpreting a report on the bacterial flora other than *B. tuberculosis*, it is frequently difficult to know what emphasis to place on the different findings. Much depends on the efficiency with which the patient has washed out his mouth before expectorating the sample. Sarcinæ, leptothrices, yeasts, and even *Staphylococcus albus* are of very little significance. The so-called diplo-streptococcus also is not as a rule of much significance. Pneumococci, streptococci, *M. catarrhalis*, *B. pneumoniæ* Friedländer, and *B. influenzæ* are of pathological significance. Any combination of them may be found together and they are all common during the catarrhal seasons of the year, irrespective of the anatomical situation of the lesion. A bacteriological report should state which of the species predominates. It is sometimes said that any species found to be intracellular is of special pathological significance. As stated above, a sputum crowded with organisms of all kinds, especially if the sputum be foul smelling, is very suspicious of bronchiectasis or pulmonary abscess. When "granules" are found in the sputum actinomycosis fungi should be searched for. This disease is characterised in the lung by its frequent association with "pointing" empyema and may follow operation for appendix abscess. Others of the higher bacteria—e.g., mucor and aspergillus—are also sometimes found in sputum associated with bronchitis. It must be remembered, however, that mucor especially may be an accidental contamination, and its presence should be confirmed by repeated examination. As a rule these cases give a history of some occupational risk or dusty trade.

Unusual Substances.

Curschmann's spirals and Charcot-Leyden crystals are, of course, associated with true spasmodic asthma; and *Entamœba histolytica* with tropical abscess rupturing through the diaphragm. The latter is characterised by "anchovy paste" sputum. When search for the entamœba is required, the specimen of sputum should be as fresh as possible. Fibrin is found in sputum where there is extensive lung tissue destruction, as in chronic phthisis, bronchiectasis, and pulmonary abscess; it is the one object of search which necessitates a large amount of sputum for examination (an ounce or more).

Sputum may contain unusual substances such as pieces of sloughing mucous membrane, calcified nodules, or foreign bodies. These should always be sent to the laboratory for identification.

The hooklets of hydatid disease may also be found in sputum. Although this disease is not common in this country, it does sometimes occur associated with hæmoptysis or signs of lung compression.

* Part (1) appeared in THE LANCET last week.

With regard to *animal inoculation tests*, now that pneumococcus typing tests—for which the mouse was generally used—are only occasionally made, the guinea-pig test for tubercle is the commonest inoculation test required. One of its disadvantages is the length of time which must elapse before a report can safely be made—i.e., about one month. In cases of urgency it is best to inoculate two animals and to kill one at the end of a fortnight, leaving the other to go on for a month or six weeks.

Special Articles.

SOME CONSTITUENTS OF DRIED YEAST AND YEAST EXTRACTS.

THEIR APPLICATION IN HUMAN NUTRITION.

BY STANLEY G. WILLIMOTT, PH.D. CAMB. AND LIVERP., B.SC.;
AND
FRANK WOKES, B.SC., F.I.C.
(*From the Biochemical Laboratory, Cambridge.*)

IN a recent discussion in THE LANCET [1] on the relative food value of white and wholemeal flour the suggestion was made that the admitted deficiency of vitamin B in white flour might be made good by yeast. "Any lack of vitamin B in white flour is definitely remedied when the flour is made into bread by the addition of yeast." [2] No data, however, were offered concerning either the vitamin content of different yeasts or the amounts of these yeasts which are normally employed in bread-making. In the absence of this necessary information the suggestion has, not unnaturally, been severely criticised.

In the meantime, progress in improvement of the staple cereal food of the nation appears to have reached a deadlock. Reasons for this are not hard to find. Perhaps one of the strongest is the conservative attitude adopted by most people towards a suggested radical change in the largest part of their diet. Bread, on an average, constitutes at least two-fifths of the diet of the mass of the population. The questions of appearance, palatability, coarseness of texture (often due to the bran employed), digestibility and keeping qualities have also proved to be important determining factors. Finally, there is the economic problem. Wholemeal bread is still slightly dearer than white bread.

This position is unfortunate, as by the proper use of yeast all these objections can be overcome. Yeast is undoubtedly a cheap and potent source of vitamin B, and abundant supplies are readily available. As long ago as 1910 Schaumann [3] obtained from yeast an extract of high physiological activity, but he drew no satisfactory conclusions regarding the constituents to which this activity was due. In 1912 Sir F. Gowland Hopkins [4] showed that yeast contained a potent growth-promoting factor which, in the light of further knowledge, was presumably vitamin B. During the last few years yeast and yeast preparations have been increasingly employed as standard sources of vitamin B. From these facts the idea has naturally arisen of supplying to white flour the missing vitamin B by the use of a potent yeast. The question which remains to be decided is the proportion of yeast necessary to be added to ensure a palatable bread of adequate potency.

On the manufacturing side experiments are already being made. There are now being placed on the market a number of white flours to which dried yeast in different proportions has been added. The results given by these modified flours, taken in conjunction with the laboratory findings here recorded, will be of great value in human nutrition. Every busy practitioner must feel somewhat bewildered at the number and the claims of proprietary preparations, purporting to contain vitamin B, with which his consulting room is constantly flooded. In these circumstances impartial scientific data may be of service. An investigation was therefore undertaken into the possibility of employing dried yeast and yeast extracts to supply the constituents lost in the removal of the wheat germ by the usual milling processes of to-day. These constituents include vitamins, proteins, and various mineral salts. Amongst the latter, phosphates are perhaps of most interest on account of their relation to nerve nutrition, in which vitamin B (antineuritic factor) appears to play a part. In fact, so well recognised is this removal of minerals in modern milling processes that one classification of flours is based on their mineral content. The most highly refined white flour, for example, is generally found to contain less than 0·4 per cent. of minerals, an average seconds flour from 0·7 to 0·8 per cent., and a wholemeal 1·0 per cent. or more, as compared with 1·4 to 1·9 in the whole wheat berry.[5] Of the total minerals, roughly two-thirds consist of potassium phosphate.

Another staple cereal food, rice, also has its vitamins and its minerals, especially phosphates, removed by modern milling processes. Unpolished rice was found by Fraser and Stanton [6] to contain about twice as much phosphate as polished rice. In the earlier work on beri-beri the curative substance was believed to be either itself an organic phosphorus compound, or some other substance closely associated with such a compound. This view was officially adopted by the Far Eastern Association of Tropical Medicine. A resolution [7] was passed that rice containing less than 0·4 per cent. of phosphorus should be excluded by law from those countries in which this cereal formed the staple food grain. Later work,[8] however, disproved the suggestion that vitamin B is a phosphorous compound. But the association of vitamin B with phosphorous compounds in rice, wheat and other natural foodstuffs is still of great practical importance.

If the vitamin and minerals absent from white flour are to be adequately supplied by yeast preparations, these constituents must be present in sufficiently high concentration to furnish the necessary amounts of each factor when the yeast is added at a level practicable from the point of view of palatability, &c. The level at which fresh yeast is ordinarily added to flour in bread-making is variable, though always in the neighbourhood of 1 per cent.[9] The actual amount of yeast added depends upon the length of time the dough is to be fermented. Thus with 12 hours' fermentation the quantity of compressed yeast added just exceeds 0·1 per cent. of the weight of the flour, but with only one hour's fermentation the percentage of yeast employed rises to 1·4.[10] However, it is possible to add a suitable dried yeast to flour up to a level of 4 or 5 per cent., producing a flavour which is distinct but not disagreeable. Vienna bread, for example, which contains a large proportion of yeast, is noted for its palatability.

The proportion of dried yeast necessary to supply an adequate amount of vitamin B to white flour is about 3 or 4 per cent. of the flour used. Taking the average moisture content of fresh yeast as 70 to 80 per cent., this would be equivalent to approximately 15 per cent. of fresh yeast. Therefore the highest amount of fresh yeast known to be employed in bread-making—i.e., 1·4 per cent.—is only about one-tenth of what would be required to furnish sufficient vitamin B. These findings lend no support to the statement made by several investigators that "any lack of vitamin B in white flour is definitely remedied when the flour is made into bread by the addition of yeast,"[2] where fresh yeast is meant. On the other hand, our results show that it is possible to make good the deficiency by the proper use of dried yeast. In order to avoid undue fermentation by the large proportion of yeast, this must have been dried at a temperature sufficiently high to destroy the diastatic enzymes.

The fact that dried yeast has a distinctly bitter flavour has led to efforts to extract the vitamins and other valuable constituents from fresh yeast by treatment with suitable solvents which do not remove the bitter constituents so readily. The extracts thus obtained are exhibited in the liquid or semi-solid condition as a palatable adjunct to the diet. In such forms vitamin B is commonly prescribed to-day. The tendency of modern diets to be deficient in vitamin B [11] has afforded opportunity to manufacturers of such extracts to advocate their general use. Evidence has recently been put forward by Plimmer, Rosedale and Raymond [12] that the vitamin B potency of such extracts may vary as much as 200 or 300 per cent. Fresh brewers' yeast is known to have a high vitamin content. Therefore it appeared probable that this variation in vitamin activity was due, in part at least, to differences in the method of extraction employed. A consideration of these facts suggested the desirability of examining quantitatively samples of yeast and of extracts prepared from them. This necessitated ascertaining their content of vitamins by feeding experiment, and of mineral and other constituents by analysis.

Preparation of Yeast Extracts.

In preparing extracts of yeast for human consumption several points have to be considered. A solvent must be employed which will take out as much as possible of the vitamins and other desired constituents—e.g., phosphates—while leaving behind the unpalatable, bitter principles. (Vitamin B is now known to contain at least two factors, the antineuritic principle of Eijkman [13] or vitamin B, and the pellagra-preventive (P-P) factor of Goldberger [14] or vitamin B_2. Whenever the term vitamin B is used, both these factors are implied.) Vitamin B is known to be soluble in water, in aqueous solutions of certain salts, and in water-alcohol mixtures. By employing a suitable strength of alcohol (say, 75–80 per cent.) fairly complete extraction of the vitamin can be effected without dissolving any considerable proportion of the bitter principles.

On the commercial scale, where the expense of alcohol is an important consideration, satisfactory results can be obtained by heating the yeast with strong saline solutions under proper conditions. The exact conditions employed by different manufacturers are, of course, industrial secrets. Apparently the saline solutions employed vary widely in strength, from 2 to 10 per cent. or more, and the time of heating may be anything from half an hour to several hours. The destruction of the yeast enzymes without serious loss of vitamin potency is thus ensured. Finally, in view of the wide variation in composition of different batches of yeast, it is important to use raw material from carefully selected sources, and produced under properly controlled conditions. From recent work by Randoin and Lecoq [15] it appears probable that distillery yeast differs from brewers' yeast in not containing the antineuritic principle of Eijkman.

Perhaps the first yeast extract to be placed on the market was marmite. This preparation is a stiff, dark brown paste, containing about 27 per cent. of water, the same proportion of salts, and about a third its weight of nitrogenous matter (see Table I.). It can be rubbed down with water to form a dark brown liquid of a salty, bitter taste. It is noteworthy that this product contains a large proportion of salt (about 13 per cent.) compared with less than 0·2 per cent. in average samples of fresh yeast. Since its introduction marmite has been largely employed as a standard source of vitamin B both in clinical practice and in research. On account of variations in the activity of marmite, dried yeast is probably a more satisfactory standard for research work. For therapeutic use, on the other hand, an extract such as marmite is more convenient. Marmite was administered in large quantities as a prophylactic against beri-beri to the troops in Mesopotamia during the war. A tablet containing ¼ oz. of marmite was given once or twice a week to supplement the vitamin B content of the ration. In preparing these tablets some difficulty was experienced on account of the bitter taste. This was eventually overcome by admixture with suitable fat, such as bacon fat or cotton-seed oil.[16] In our own experiments it was decided to overcome the bitter taste of marmite, and also obtain greater accuracy of dosage, by making an alcoholic extract. 250 g. of fresh marmite, purchased on the open market, were extracted with 75 per cent. alcohol by mechanical shaking in a stoppered Winchester at room temperature for over three hours. The aqueous-alcoholic extract was then decanted off, and the alcohol removed by heating on the water bath at 80° C. for an hour, using broken pot to facilitate the distillation of the solvent. The work of Chick and Hume [17] shows that this treatment would destroy very little of the vitamin B present. When no more solvent distilled over, the dark-coloured aqueous extract remaining in the flask, containing the vitamin B, was filtered and made up to 250 c.cm. with distilled water. Thus 1 c.cm. of this extract was equivalent to 1 g. of marmite. It was almost free from the bitter taste of the original product.

It has recently been suggested by Plimmer [11] that the vitamin potency of marmite has diminished within the last few years, since a larger dose—i.e., 4 per cent. of the diet—is now required to produce the same curative effect as was previously obtained with only 2 per cent. Workers in other laboratories have experienced similar results (private communication). Since the earlier experiments were carried out, however, much more has been learnt of the necessity of balancing the vitamin B intake against various constituents of the diet (Funk,[18] Hartwell,[19] and Plimmer [20]). This knowledge has led to the introduction of more accurate methods of testing for the vitamin, and may be one of the causes of the apparent deterioration of the marmite. A further complication arises from the recent confirmatory work of Chick and Roscoe [21] that vitamin B contains at least two factors—viz., the antineuritic principle of Eijkman and the pellagra-preventive factor of Goldberger. Since both factors are necessary for the maintenance of health and growth (Chick and Roscoe), these criteria have been employed in our estimations of the vitamin B content of various extracts.

In addition to marmite, Plimmer [11] also tested five other samples of yeast extract and discovered a variation in vitamin B potency of 200 or 300 per cent. Some were weaker and others were stronger than marmite when tested on pigeons by the same procedure. Our own experience with rats having confirmed this wide variation in the content of the most important constituent, we considered it advisable to carry out experiments on the efficacy of industrial extraction methods. For this purpose it was necessary to obtain a standard supply of fresh yeast, prepare an extract from it under known conditions, and determine the amount of vitamin and other constituents both in the extract and in the residue. The data thus obtained should indicate the efficiency of the process for extracting the vitamins and other principles, and also afford some evidence on the significance of phosphates and other analysable constituents in yeast extracts. For the preparation of this experimental extract the raw material employed was a good quality brewers' yeast, obtained from a satisfactory source, in which strict analytical control was maintained over the purity of the product. Immediately after removal of the alcoholic liquor it was conveyed to the laboratory, and heated to 98° C. with a strong saline solution (about 5 per cent.) for several hours but not long enough to affect the vitamins. The extract was then cooled and filtered, using moderate pressure, and the filtrate, which was a brown liquid with a pleasant taste, was stored under refrigeration conditions during the investigation. Analysis of this experimental extract*

* A yeast extract, prepared in a similar manner and presumably of the same composition, has recently been placed on the market under the title "Verva" by Mr. Hugh Mapleton, of Garston, Liverpool, to whom we are indebted for supply of materials and certain manufacturing facilities.

showed that it contained only about one-third of the amount of nitrogenous derivatives found in commercial yeast extracts such as marmite. On the other hand, its water-content being double that of marmite, some reduction in vitamin potency might be anticipated. This reduction could have been obviated by concentration of the extract to a paste but, in view of the greater accuracy of liquid dosage, concentration was not attempted. The next step, therefore, was to ascertain by feeding experiments the comparative potency of the extracts in vitamin B.

Feeding Experiments with Yeast Extracts.

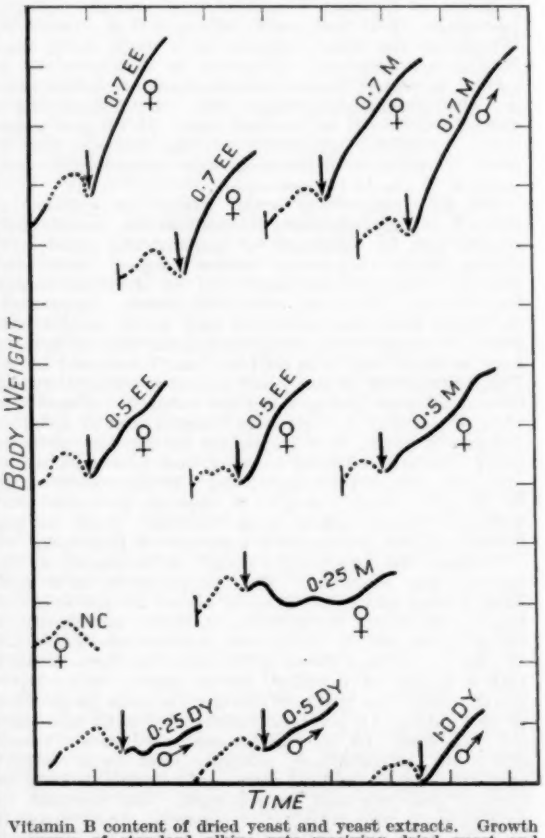
For an accurate assay of vitamin B it is essential that the basal diet shall be as free as possible from this vitamin. This can be ascertained by restricting a group of young standard rats to the basal diet whilst supplying vitamins A and D in the form of cod-liver oil. It is advisable not to attempt to supply vitamin C, because the usual sources of this vitamin are liable to be contaminated with vitamin B.[22] Moreover, it is well known that the absence of vitamin C does not appear to exert any prejudicial effect on the rat.[23] On such a vitamin B-free diet growth of all the rats should cease, and a steady decline in weight set in within two or three weeks. Precautions must be taken to prevent the animals gaining access to their fæces, which may serve as a source of the vitamin. The condition of the carbohydrate in the diet is of great importance, and constitutes a problem in itself. Recent work by Bacharach and Hartwell [24] indicates that on a diet lacking vitamin B the loss in weight appears more quickly when uncooked starch is employed.

The vitamin B deficient diet usually employed in Cambridge during recent years [25] has the following composition: raw potato starch, 40; sugar, 17; refined palm kernel oil, 15; purified caseinogen, 23; salt mixture, 5. This ration, with the addition of cod-liver oil, has usually been found to produce stoppage of growth within three weeks. In certain cases, however, irregular results have been obtained. Our most extreme case was one in which ten young albino rats after five weeks on the experimental diet were still increasing in weight, and showed an average growth increase of about half the normal. These abnormal results led to an examination of the diet for possible contamination with vitamin B. The caseinogen had been heated to above 120° C. for several hours and also had been well extracted with alcohol. It was therefore free from vitamin B. The palm kernel oil was also known by tests to be free from this vitamin. Since there is little storage of vitamin B in the body of the rat the discrepancy was traced by elimination to the potato starch. Potato starch has been used by many investigators as the source of carbohydrate in diets employed for the estimation of vitamin B. The Medical Research Council's Report on Accessory Food Factors,[22] for instance, states that starch is devoid of this vitamin. Nevertheless, our experience was that potato starch may contain sufficient vitamin B to affect seriously a vitamin assay. On replacing the potato starch of our synthetic diet by rice starch, without disturbing any other constituent, failure of growth in the normal period was at once secured (see Fig. 1) in this and other researches.[26]

A series of 12 standard albino rats (Wistar Institute strain) was then placed upon the improved vitamin B-free diet. In every case stoppage of growth had occurred within a fortnight, and before the end of the third week the weight was rapidly declining, and in several cases had reached the original level (see Fig. 1). The animals were now obviously in a poor physical condition, and in a few cases displayed premonitory symptoms of paralysis. The food intake was about 4 g. per head per day. At this point the yeast extracts were administered in doses ranging from 0·25 to 0·7 g., given separately to each animal in advance of the basal ration. One animal, which was continued on the vitamin B deficient diet as a negative control, died within a few days with definite symptoms of vitamin B deficiency. Considerable differences were observed between various animals in regard to the ease with which they accepted their doses of yeast extract. Small amounts of 0·25 g. were usually taken without difficulty, but a little sugar was found to assist the ingestion of larger doses. The marked loss of appetite is another difficulty and requires special precautions. During the actual consumption of the specified doses the animals occupied separate cages. In view of the apparent greater need of females for vitamin B [27] the experimental animals employed were mainly females. On the highest dose (0·7 g.) a male gave similar results to a female, allowing for the rather more rapid growth of the normal male. The initial weight of the animals has been shown by Osborne and Mendel [28] to have an important effect on the vitamin B requirement of rats. In the present experiments care was taken to place animals with similar initial weights on the same dose of the two extracts under test. Those with lowest initial weights were selected for the lower doses of the vitamin.

About a decade ago a number of workers found that an average dose of 0·25 g. of marmite was sufficient to restore normal growth in rats which were declining as a result of vitamin B deficiency. When, however, we tested this dose last year, either as original marmite or as the alcoholic extract, the growth response was very slight. Moreover, no significant difference in effect was observed between the original marmite or the alcoholic extract of it. (From this finding it was concluded that the method of extraction of vitamin B from marmite was reasonably efficient.) In Fig. 1 is given a typical result with this dose of 0·25 g., from which it will be seen that the animals' weight actually fell during the first two weeks of receiving the marmite. Nearly seven weeks of marmite dosage had elapsed before the animal regained and passed its initial weight. In this case recovery was finally achieved, but in several others,

FIG. 1.



Vitamin B content of dried yeast and yeast extracts. Growth curves of standard albino rats receiving dried yeast and yeast extracts in different doses as sole source of vitamin B. Each vertical division represents 20 grammes of body-weight, whilst each horizontal division represents 20 days. The broken lines represent growth on the basal B free diet; the continuous lines represent the growth after the addition of the yeast. EE denotes experimental extract. M denotes marmite. NC denotes negative control (receiving no yeast or other source of vitamin B). DY denotes dried yeast (the residue left after preparation of the experimental extract).

details of which have been omitted in order to save space, death supervened.

A dose of 0·25 g. of marmite having proved insufficient, the amount was now increased to 0·5 g., while two similar animals were put on the same dose of the experimental extract. The growth response was much better than with the 0·25 g. dose, and the experimental extract appeared to be at least as potent as the marmite, although containing only two-thirds the amount of total extractive matter. The rate of growth was still subnormal. A still higher dose of 0·7 g. was therefore tried, two animals being placed on marmite and two on the control extract. From Fig. 1 it will be seen that with this dose practically normal growth was secured with both the yeast extracts. The food intake was 8–9 g. per head per day. Possibly a dose between 0·5 and 0·7 g. might have proved adequate. From other experiments, we believe the minimum adequate dose to be not much below 0·6 g. These results might be taken to indicate that the vitamin B content of marmite has diminished to less than one-half of its original value during the last few years. Part of this apparent loss may be due to refinements in technique, and probably the figure suggested by Plimmer [11] of a 50 per cent. deterioration is more nearly correct.

Feeding Experiments with Dried Yeast.

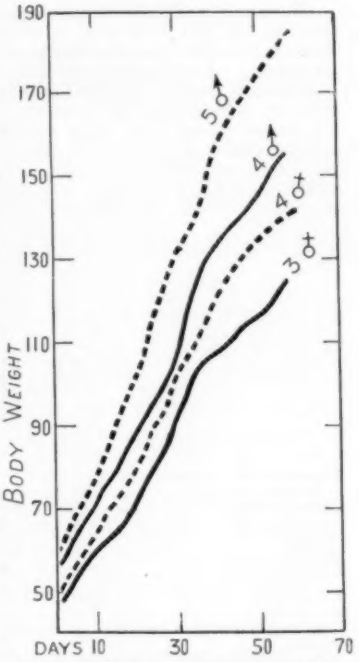
From the standpoints of industry and research alike, dried yeast is a most important source of vitamin B. The removal of the moisture produces, with proper precautions, a stable and highly concentrated product, very suitable for mixing with white flour in bread-making, to increase the vitamin B content; it has also been found the most satisfactory standard for assay work.[29] Experiments have shown that a good sample of dried yeast should restore normal growth when fed in doses of 0·3 to 0·5 g. to rats suffering from vitamin B deficiency. Taking the daily food intake as about 10 g. per head, this would mean from 3 to 5 per cent. of the diet. Some dried yeasts of unusually high potency may be effective in the proportion of 2 per cent.

The above experiments showed that it is possible to obtain from yeast an extract containing only 50 per cent. of solid matter, of which doses of about 0·6 g. are adequate. The next step was to determine how much, if any, vitamin B was left in the residue from which the extract had been prepared. For this purpose it was decided to remove all moisture from the residue, in order that it might be fed as a dry product. The residual sludge was dried by passage over steam-heated rollers in such a thin layer that less than one minute's exposure to the temperature of 100° C. sufficed to drive off practically the whole of the moisture. By this means any destruction of vitamin B was avoided. The product was in the form of thin light brown flakes, which were readily reduced to powder. Less than 1 per cent. of this powder failed to pass through a sieve of No. 40 mesh. Thorough mixing of the sieved powder ensured a product of uniform consistency, truly representative of the residue from which it had been obtained. The powder, when stored without any special precautions, underwent no noticeable deterioration in 12 months. Tests showed it to be free from diastatic enzymes. It was then fed to three rats suffering from vitamin B deficiency, in doses of 0·25, 0·5, and 1·0 g. respectively. The results, which are recorded in Fig. 1, indicate that 0·5 g. produced rather better growth response than 0·25 g. of marmite; 1·0 g. was about equal to 0·5 g. of the experimental extract. Allowing for the water content of the latter, the actual ratio of curative doses in the solid matter was therefore about 4 in the extract to 1 in the residue. Hence it would appear that the method of extraction employed had taken out roughly four-fifths of the total amount of vitamin B present in the raw material.

Nutritive Value of Yeast Protein.

In view of the high proportion of protein and other nitrogenous constituents in yeast, the question arises as to the possible value of these in nutrition, and the effects produced by their ingestion in large amounts. Various preparations of yeast have been used both for human and for animal food, and divergent opinions on their nutritivevalue are to befound in the literature. According to Berg,[30] the so-called "nutritive yeast," which was intended to be a rich source of protein for human consumption in Germany during the stringent times of the war, failed in its purpose. Others have reported that the protein of yeast is of low biological value. Hawk, Smith, and Holder[31] find that yeast protein cannot usefully exceed from 10 to 30 per cent. of the diet of man. If an excess of yeast is taken diarrhœa results. In view of these discrepant opinions, it was decided to test the dried yeast residue remaining over from the extraction process in the preparation of the experimental extract, and containing the larger part of the nitrogenous constituents of the original yeast. This was employed as the sole source of nitrogen, and was supplied in the unusually high concentration of 50 per cent. of the total ration, so that any possible toxic effect might be readily revealed.

FIG. 2.



Dried yeast as a source of protein. Growth curves of standard albino rats receiving dried yeast as sole source both of protein and of vitamin B. (Body-weight is shown in grammes.) Each curve is a composite one giving the average growth of a group of animals of the same sex. The continuous lines represent growth of the experimental groups receiving the whole of their protein in the form of dried yeast; the broken lines represent growth of control groups receiving their protein in the form of caseinogen. Apart from this difference, and the supply of vitamin B to the control groups as marmite, the diets were identical.

Seven albino rats of the same stock as previously used, and of about 52 g. initial weight, were restricted to the following diet:—

Dried yeast ..	.. 50	Cane sugar ..	.. 30
Palm kernel oil	.. 15	Salt mixture ..	.. 5

All the ingredients except the dried yeast had already been tested for their freedom from vitamin B. The dried yeast was thus the only source of this vitamin as well as of protein. As before, vitamins A and D were supplied in the form of cod-liver oil, while vitamin C was not provided. The bitter taste due to the high proportion of yeast was overcome by careful admixture with the fat, and by replacing the starch of the diet by sugar. In making up the diet, allowance was made for the carbohydrate carried by the dried yeast, so that the nutritive ratio of the original formula was not disturbed. The experimental conditions were the same as before.

After a few days the animals had become accustomed to the diet and the ration was readily consumed, the food intake rising gradually from 5 g. a day. All the animals grew at a steady though somewhat suboptimal rate. After eight weeks of experiment, the average increase in weight for the males was 100 g., and for the females 77 g., compared with 125 g. and 92 g. respectively for two other groups of animals on the complete ration containing caseinogen (see Fig. 2). The food intake had risen to 9 or 10 g., and all the animals appeared to be well nourished and had good coats and bright eyes, with no neuritic symptoms. Autopsies failed to reveal any pathological conditions.

It was concluded, therefore, that (1) the dried yeast constituted a satisfactory protein when fed at the

level of 50 per cent. of the ration, (2) that it produced no deleterious effect when administered in quantities considerably larger than was necessary to supply sufficient vitamin B. No laxative effect was observed.

Analyses.

Chemical analyses were carried out on the same products as had been used in the feeding experiments, and on the raw materials from which these had been prepared. Total nitrogen was determined by the Kjeldahl-Gunning method. The factor 6·25 was used in estimating the protein. Fat was estimated by ether extraction in a Soxhlet apparatus, after careful removal of water at 100° C. Ashing was done in silica crucibles at low temperatures to avoid volatilisation of potash. Phosphorus was estimated according to the official directions published by the Board of Agriculture for the examination of feeding stuffs.

The results of these analyses are summarised in Table I., which also contains some data obtained by previous investigators on certain yeast products. Wide variations are shown in the composition of yeast preparations made by different methods. These may be due partly to differences in the raw material, and partly to differences in the methods of extraction employed. But in view of these wide variations in accurately analysable constituents, it is not surprising to find even greater difference in the vitamin B content of these yeast preparations, as shown in Table II.

TABLE I.—*Percentage Composition of Yeast Products.*

—	Moist yeast.[1]	Dried yeast.		Yeast extracts.[4]		
		From marmite.[3]	From experimental extraction.[3]	Marmite.[3]	Cerema.[3,5]	Experimental extraction.[3]
Nitrogenous matter, including protein[6] ..	11–15	13·5	45·6	37·6	24·4	11·7
Carbohydrate	15–23	44·5	44·0	11·4	29·6	19·5
Fat[7]	0·4–1·0	0·9	1·3	—	—	0·5
Minerals[8]	2–10	8·6	5·0	24·2	17·4	19·1
Moisture	65–75	2·5	4·1	26·8	28·6	49·8
Total phosp. as P_2O_5[9] ..	0·5–1·0	—	1·6	4·2	—	2·0

Notes.

1. Summary of a number of results obtained by different workers.
2. Analysis made by Plimmer.[32]
3. Analysis made in 1927 by the authors on the material used in feeding experiments. Earlier analyses by other workers show considerable variations in the composition of marmite.
4. Tested by the method of Searl,[33] creatinine, a characteristic constituent of meat extracts for which these yeast extracts were introduced as substitutes, was found to be absent.
5. Cerema is a somewhat cheaper form of yeast extract introduced as a substitute for the more expensive marmite. When examined by Plimmer and Rosedale,[33] however, it had only three-quarters of the vitamin B potency of the latter.
6. The actual protein content of yeast has been found to vary considerably.
7. Fat content varies with conditions of nutrition. These are average figures.
8. This includes, in the case of the extracts, salts added for the purpose of extraction.
9. This includes both inorganic phosphates and organic phosphorus compounds (phospholipins and phosphoproteins).

TABLE II.—*Vitamin B Content (Composite Factors) of Dried Yeast and Yeast Products.*

—	Moist yeast.[1]	Dried yeast.		Yeast extracts.	
		From marmite.[1]	From experimental extraction.	Marmite.[4]	Experimental extraction.
Minimum curative rat dose (g.)[2]	0·5–0·8	0·2	1·0	0·4–0·6	0·6
Minimum percentage in diet of rats[3]	5–8	2	10	4–6	6
Minimum percentage in human diet[4]	7–12	3	15	6–8	9

Notes.

1. Data given by Plimmer and other workers.
2. Minimum dose which will restore normal growth when supplied as sole source of vitamin B to standard rats of 40 to 60 g. weight suffering from vitamin B deficiency.
3. Assuming that food intake is about 10 g. per head per day.
4. Using Plimmer's figure [33] for vitamin B requirement of human beings—i.e., 1½ times that of the percentage requirement of rats.
5. Average results obtained in recent work by other investigators [34 35] and ourselves.

Discussion.

It has already been pointed out by Cramer and Mottram[35] that the white and wholemeal bread problem has suffered much confusion from inaccurate statements on the one hand and the unproven claims of enthusiasts on the other. The facts that have been presented show that there is justification for this view. In the past, studies on the nutritive value of white and wholemeal bread appear to have centred round the questions of the relative protein content and the calorie value. Differences undoubtedly exist, but analysis shows that such differences are too slight to be of real importance. In recent discussions, the importance of the content of vitamin B (and other constituents) of bread, the staple cereal food, has been fully recognised on all sides. Divergence of opinion, however, is encountered on such questions as the adequacy of white bread in vitamin B and how best it may be fortified. Cramer and Mottram have clearly demonstrated that the modern milling processes used in the manufacture of white flour are responsible for a considerable loss of vitamin B amongst other constituents. This decline in nutritive value has been admitted by all serious students of the bread problem since the time of Liebig,[36] who stated that "the whiter the flour the less nutritive value it possesses." But, as previously pointed out, the suggestion has recently been made that any lack of vitamin B in white flour is rectified when the flour is made into bread by the added yeast. This contention has not been verified by the experimental facts. Cramer and Mottram have shown that the highest proportion of yeast normally employed in bread-making will not supply white bread with more than one-seventh of the amount of the vitamin found in good wholemeal bread.

A number of solutions of the problem have been proposed. During the war, for instance, Weill and Mouriquand [37] used an extract of bran in place of the bran itself in making bread. Greig and Curjel [38] employed wheat germ as a source of vitamin B, adding it to zwieback in the proportion of 15 per cent. Such bread was found to be a satisfactory means of protecting the English colonial army against beri-beri. This solution, apparently successful during the abnormal times of war, might not necessarily be satisfactory in peace. In ordinary wholemeal bread the proportion of germ varies from 1 to 2 per cent. This amount supplies only a small fraction of the vitamin B required. If wheat germ is to supply an adequate amount of this factor, it must be used in much higher proportion; for example, Hovis germ bread contains about 24 per cent. This method of enriching bread with its lost constituents is hardly a satisfactory solution. Wheat germ must first be detoxicated before it can be used in bread-making, and is more costly as a source of vitamin B than dried yeast. Moreover, it is economically unsound because, in order to provide this unusually high percentage of germ, a much larger quantity of flour (more than 12 times as much) must be robbed of the vital constituents in the germ.

Cramer and Mottram propose to solve the problem by replacing white by wholemeal bread. In practice, however, a number of difficulties at once arise. Amongst these are the questions of appearance, palatability, digestibility, texture, keeping qualities,

price and, last but not least of the difficulties, the conservative attitude of the consumer. It is true that some of these obstacles can be overcome by fine grinding of wholemeal flour and improvements in the methods of baking. But a consideration which appears to have been overlooked by many investigators is the extensive change in the existing milling plant which would be necessary. Serious difficulties arise when the attempt is made to produce a satisfactory wholemeal flour by the modern roller mills in general use to-day in the manufacture of white flour. The total replacement of white bread by wholemeal would probably involve the alteration, perhaps even the scrapping, of much expensive milling plant. Such a contingency would inevitably mean a considerable rise in the price of this staple foodstuff.

In view of these difficulties, a practicable *via media* is offered by the method of adding dried yeast in proper amount to ordinary white flour. An average dried yeast is several times more potent in vitamin B than the fresh yeast employed in bread making. Such a product, used in the proportion of 2 to 4 per cent. of the flour, would yield a bread containing as much vitamin B as is found in the finest wholemeal product (see Table II.). Moreover, from our own experience we can state that a white bread fortified by the addition of dried yeast can be quite palatable and in no way offend æsthetic susceptibilities. Many indeed would not realise that they were consuming anything but ordinary bread. Since dried yeast is a by-product in large industrial processes, supplies are readily and cheaply available. Finally, this method of supplying vitamin B, as well as phosphates and other valuable constituents missing from white flour, necessitates no expensive new plant, nor the scrapping of that already in operation.

Up to this point the use of dried yeast has been considered in a prophylactic capacity only. Often, however, the physician desires to administer larger quantities of vitamin B to make good, as rapidly as possible, a serious deficiency. In such cases yeast extracts appear to be very satisfactory because they can be easily administered in large and controlled doses. They should possess a high potency in vitamin B, varying only within small limits. Commercial extracts may vary in vitamin B potency by several hundred per cent., but our results have shown that a potent yeast extract can be made, under properly controlled conditions, by a simple inexpensive method. The product thus obtained was at least as active in vitamin B as the more expensive marmite. Being in a liquid form, it is very suitable for therapeutic and domestic use.

One or two important provisos should be made. The dried yeast which is to be employed in bread-making should of course be examined for its constituents and specially tested for its content of vitamin B. Our own experiments indicate that the employment of dried yeast, even in high proportions, is free from the danger of introducing toxic constituents such as are found in wheat germ. Another consideration of the first importance is the growing practice of "bleaching" flour. Amongst the chemicals used for this purpose are ammonium persulphate, nitrogen peroxide, nitrogen trichloride, benzoyl peroxide, and chlorine. Apart from the probable inimical effects of these substances on health, which would be cumulative, their presence in bread would serve to lessen through oxidation the amount of active vitamin. From both points of view their use is both unnecessary and undesirable. The best immediate practical way of solving the bread problem, in the present situation, is to add dried yeast to flour.

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INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED SEPT. 15TH, 1928.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 92 (last week, 123); scarlet fever, 1977; diphtheria, 1021; enteric fever, 122 (last week, 108); pneumonia, 540; puerperal fever, 45; puerperal pyrexia, 92; cerebro-spinal fever, 6; acute poliomyelitis, 17; acute polio-encephalitis, 3; encephalitis lethargica, 13; continued fever, 1; dysentery, 6; ophthalmia neonatorum, 109. No case of cholera, plague, or typhus fever was notified during the week. The notifications of small-pox are under 100 for the first time for more than two years.

The following counties each notified 3 or more cases of enteric fever:—London, 21; Chester, 3; Devon, 5; Essex, 6; Gloucester, 8; Huntingdon, 4 (St. Ives); Lancaster, 3; Norfolk, 5; Northumberland, 3; Southampton, 8; Sussex East, 6; Warwick, 3; Yorks, East Riding, 5 (Pocklington); Yorks, North Riding, 3; Monmouth, 3. The total of 122 includes 27 cases of paratyphoid fever, of which 12 were notified in London.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on Sept. 18th–19th was as follows:—Small-pox, under treatment 11, under observation 2; scarlet fever, 1647; diphtheria, 1466; enteric fever, 87; measles, 101; whooping-cough, 237; puerperal fever, 13 (plus 7 babies); encephalitis lethargica, 70; poliomyelitis, 2; "other diseases," 20. At St. Margaret's Hospital there were 17 babies (plus 9 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox (the last quarter has now been entirely clear), 2 (0) from enteric fever, 10 (1) from measles, 2 (1) from scarlet fever, 22 (6) from whooping-cough, 20 (5) from diphtheria, 125 (35) from diarrhœa and enteritis under two years, and 17 (5) from influenza. The figures in parentheses are those for London itself.

The fatal cases of enteric fever were reported from Plymouth and Bristol. Of the 9 fatal cases of measles outside London 3 each were reported from Liverpool and Newcastle-on-Tyne, Belfast reporting 10 in the same week. There was a further slight increase in the number of deaths from diarrhœa, of which Liverpool reported 15; West Ham, Birmingham, Manchester, Leeds, and Middlesbrough 5 each; Bristol and Hull, 4 each; while Glasgow, Dublin, and Belfast reported 14, 9, and 7.

The number of stillbirths registered during the week was 274 in the great towns (corresponding to a rate of 41* per 1000 births), including 55 in London.

* The rate was misprinted 89 for 39 last week.

POST-VACCINAL ENCEPHALITIS.

REPORT OF THE LEAGUE OF NATIONS COMMISSION.

AN important session of the Health Organisation of the League of Nations was held at Geneva from August 22nd to 25th. The report[1] of the proceedings has now reached us. Prof. Ricardo Jorge, Director-General of Public Health Services, Lisbon, presided, and those present were :—

Members of the Health Committee : Sir George Buchanan, Senior Medical Officer, Ministry of Health, London ; Dr. H. Carrière, Director of the Federal Health Service, Berne ; Dr. N M. Josephus Jitta, President of the Health Council of the Netherlands, The Hague.

Experts : Prof. H. Aldershoff, Director of the State Serological Institute, Utrecht ; Dr. F. R. Blaxall, Government Lymph Establishment, London ; Prof. M. Camus, Director of the Superior Institute of Vaccine, Academy of Medicine, Paris ; Prof. Dr. H. A. Gins, Robert Koch Institute, Berlin ; Dr. H. Mervyn Gordon, St. Bartholomew's Hospital and College and Medical Research Council, London ; Prof. A. Groth, Landesimpfanstalt, Munich ; Prof. G. Sobernheim, Director of the Health Institute of the University, Berne.

The questions considered by the Commission were post-vaccinal encephalitis, and the preparation and preservation of vaccine lymph. The third subject on the agenda was the relationship between the different types of small-pox virus and those of certain human and animal pathogenic viruses, but it was decided to postpone discussion until the problem had been further examined.

A preliminary discussion on *post-vaccinal encephalitis* by a subcommission led to the framing of a report which was adopted by the Commission and is summarised below.

Terminology.—The term "post-vaccinal encephalitis" is used in the report for convenience, without necessarily implying that "post-vaccinal" is considered the equivalent of "propter-vaccinal." Some of the thousands, even millions, of persons who are successfully vaccinated in any given year must fall ill during this period in the ordinary chances of life, and they are no more immune from diseases specially affecting brain and nerves than any other persons. During recent years many countries have experienced a considerable prevalence of epidemic encephalitis (or encephalitis lethargica). The disease has no connexion with vaccination, but it may well be supposed that occasionally persons who have been recently vaccinated would be attacked by it as a matter of chance, like any others. The same consideration applies to chance coincidences between vaccination and attacks of epidemic poliomyelitis. Such rare coincidences, however, do not constitute the "post-vaccinal encephalitis" now under consideration. Encephalitis may occur as a complication of numerous infections, such as measles, or various forms of toxæmia, and it occurs, though rarely, as a complication of small-pox itself. It would be permissible clinically, and perhaps also pathologically, to group all such encephalitis under a single term, encephalitis *post-infectionem*. Vaccination is an infection. It is not implied that post-vaccinal encephalitis is not capable of being classed with, and attributed to, the same ultimate causes as "encephalitis *post-infectionem*," although there are practical reasons for considering it separately and by a separate name at the present time.

Cases in the Netherlands and in England and Wales.

The post-vaccinal encephalitis with which the report deals has become a problem of itself mainly in consequence of the events of the last few years in the Netherlands and England and Wales. In each of these countries the cases which have occurred have been sufficiently numerous and similar to require them to be considered collectively. Their occurrence has led to the realisation that a new, or at least a previously unsuspected or unrecognised, risk attaches to the practice of vaccination. This risk, when taken at its maximum value, is minute in proportion to the vast numbers of normal vaccinations to which the cases of post-vaccinal encephalitis correspond, and it is easy to exaggerate its importance. Nevertheless, it is one whose existence, in these two countries at any rate, has to be recognised, and its meaning considered. In fact, it has in the Netherlands been considered of sufficient gravity to cause the temporary suspension of the administrative measures by which the vaccination of children is secured, while in England the subject has already received the attention of two expert committees appointed by the Ministry of Health, the second of which (the Rolleston Committee) has now presented a comprehensive report,[2] embodying the information and conclusions arrived at by the first or Andrewes Committee, whose work was described to the Health Commission of the League of Nations in 1926.

In the Netherlands, 139 cases of disease of the central nervous system following vaccination were described during 1923 to 1927, of which 41 died. In England and Wales, taking the arbitrary periods dealt with respectively by the Andrewes and Rolleston Committees, 62 cases with 36 deaths occurred between Nov. 14th, 1922, and Nov. 1st, 1923, while a further group of 40 cases occurred between Jan. 1st, 1926, and Sept. 30th, 1927. Of these 40 cases, however, 15 were excluded by the Rolleston Committee on account of their doubtful nature, leaving for consideration 25 cases, of which 12 died, in the second period. The two combined, on this basis, gave a total of 87, of which 48 were fatal, for England and Wales during the two periods under investigation by these Committees.

The clinical characteristics of post-vaccinal encephalitis, as met with in both countries, are quoted from the Rolleston Committee report. Pathologically, the fatal cases have shown diffuse encephalomyelitis, the inflammation being mainly perivascular in type and often accompanied by œdema. The pathological changes in some instances resemble those found in acute disseminated sclerosis, and differ in essential respects from those met with in fatal epidemic encephalitis. The presence of the vaccinia virus in the brain tissue of certain of the fatal cases has also been definitely established. This fact, however, must be considered in the light of modern knowledge regarding the dissemination of this virus after vaccination. The brains were examined at a period after vaccination when it would be anticipated that the brains of many normal vaccinated persons, could they be tested, would equally yield the vaccinia virus.

"*Incubation period.*"—The period which usually elapses between vaccination and the onset of symptoms of encephalitis (the "incubation period") is from 9 to 13 days. The Rolleston Committee found that, out of 125 cases collected from the British and Continental sources, the onset was between the ninth and thirteenth day after vaccination in 94, and the most favoured day was the eleventh.

Age-incidence.—In both countries post-vaccinal encephalitis has occurred more rarely in infants under the age of two years than in older children and in adults.

During the four years 1924 to 1927 in the Netherlands 4 cases occurred among 126,124 vaccinations under the age of two years, as against 130 cases among 462,212 vaccinations between the ages of 3 and 12 ; in other words, 1 case to every 31,531 vaccinations at ages 0 to 2, and 1 case to every 3555 vaccinations at ages 3 to 12. The vaccination figures are based on the doses of lymph issued and not on the actual vaccinations performed ; they are, therefore, an over- rather than an under-statement.

In England and Wales the predilection of the disease for older children has been equally notable, though figures comparable to the Dutch of vaccinations at ages are not obtainable. The vaccinations done by the public vaccinators in England and Wales under the vaccination law of the country are normally limited to the vaccination of infants under two years. But in the English series of 87 cases of post-vaccinal encephalitis referred to above, those under two years of age were only eight in number. During recent years, owing to the prevalence of small-pox, an exceptionally large number of school-children have been vaccinated who had escaped vaccination in infancy, and the

[1] Publications of the League of Nations. Health. 1928. III. 12. C.H. 739.

[2] See THE LANCET, August 4th, 1928, p. 233.

majority of the English post-vaccinal encephalitis cases have occurred among these school-children.

Method of vaccination: source of lymph.—Most of the post-vaccinal encephalitis cases in both countries have occurred in children whose vaccination, to judge from all ordinary signs and cutaneous reactions, has run a normal course. No single method of vaccinating has been exclusively concerned. The American practice of using minimal quantities of vaccine lymph has, up to the present, been so little followed, however, in the Netherlands or in England that it is not possible to ascertain whether in any case encephalitis has followed the use of this method.

Many different vaccine lymphs have been used to vaccinate the cases which developed encephalitis, and no one source of lymph has been proved to be more associated with the occurrence of the disease than another.

The *geographical distribution* of the cases in each country has been wide.

The cases have chiefly occurred in those regions and at those times when organised vaccination of the population was in progress. Nevertheless, it is noteworthy that, both in the Netherlands and in England and Wales, there have been large populous areas in which vaccination has been carried out on a large scale on persons of all ages during the past four or five years without the occurrence of any post-vaccinal encephalitis. On the other hand, in certain rural districts, sometimes in quite small villages or rural communes, local vaccination has been attended by a relatively excessive proportion of encephalitis cases. Striking illustrations of this circumstance have been supplied in the Dutch reports.

Originally in the Netherlands the local distribution of post-vaccinal encephalitis showed a notable degree of correspondence with the local distribution of known cases of epidemic encephalitis (encephalitis lethargica), but this correspondence has not been maintained in the later series of Dutch cases, and has never been established in any of the English series.

In no country other than the two under discussion has the occurrence of encephalitis been on any considerable scale, but cases of the same sort have been reported in 1922 from Portugal (1); in 1924 from Prague (8), from Switzerland (2), and Germany (3); in 1927 from Poland (2), and the United States (4); and in 1928 from British Guiana (1).

Research has so far failed to give any sufficient or generally accepted explanation of the cause or causes of post-vaccinal encephalitis. The questions whether the appearance of post-vaccinal encephalitis can be checked by the habitual use of smaller doses of vaccine, or by the adoption of different methods of vaccination, are being studied in the countries specially affected. It is hoped, however, that the proposals, in the second part of the report, for international expert coöperation in the study of the different viruses allied to vaccinia; of the effect of diluting vaccine lymph; of the use of antiseptics in lymph preparation, and so forth, may prove to be of use, directly or indirectly, to those who are doing research work on post-vaccinal encephalitis.

Cases in Other Countries.

From the international point of view, it is important that further inquiries should be made as to the existence of post-vaccinal encephalitis in countries other than the Netherlands and England and Wales. If, as it appears, the condition is one which occurs with the utmost rarity among infants vaccinated under the age of two years, and if also it is the fact that post-vaccinal encephalitis is similarly of the utmost rarity after revaccination of older children or adults, it is probable that there are many countries in which little or no post-vaccinal encephalitis is likely to occur. In these countries, the great majority of the population is vaccinated in infancy. But, on the other hand, there are certain countries in which, like the Netherlands, primary vaccination at school age is habitually practised, or in which, as in England, large numbers of children of school age or adults are vaccinated for the first time on account of the appearance of small-pox. It is in such instances that the establishment of the negative, after full inquiry and observation, would be of the greatest value as a control to the English and Dutch experience.

It is fallacious to expect these cases to be brought to the notice of the Central Health Authority merely through the ordinary channels of infectious disease notification. This fact may be attributed either to failure on the part of the practitioner to connect the subsequent illness with previous vaccination, or to the fact that the doctor in attendance on the case during the nervous illness is not the one who performed the vaccination. A further complication in the inquiry is the occurrence of transient cases, or cases with indefinite symptoms, which are readily considered by the practitioner to be due only to vaccination. The four cardinal symptoms of the disease (temperature, vomiting, headache, and drowsiness) may each or all occur in course of normal vaccination in a young child.

The possible fallacies of a negative return from either a country or districts in a country are therefore very great, and a statement that cases of post-vaccinal encephalitis do not occur in a given locality can only be of value if made after most careful inquiry on the spot by a competent investigator, who has access to doctors, hospitals, schools, and all other sources of information in the area. Inquiries are to be made with a view to indicating a limited number of countries or regions which would be appropriate for such investigations.

Conclusions.

The facts and considerations which have been before the Small-pox and Vaccination Commission at its present session seem to permit the following conclusions:—

(*a*) The foremost of these is the rarity of cases of post-vaccinal encephalitis, even in the countries specially affected, by contrast with the number of vaccinations. We are in fact concerned with a minimal proportion of them. (*b*) Apparently the matter is not one in which mere coincidence between vaccination and encephalitis can be invoked; in other words, we are not dealing with a merely fortuitous occurrence. (*c*) In our present state of knowledge we must conclude that post-vaccinal encephalitis is a different disease from encephalitis lethargica. The conditions under which post-vaccinal encephalitis has manifested itself in the Netherlands and in England and Wales tend to show that children between 3 and 13 years of age are particularly susceptible, whilst infancy and adult ages are almost wholly exempt. All observations point to the conclusion that the appearance of encephalitis is not connected either with particular strains of lymph or with particular accidents of lymph preparation. (*d*) Passing to the ætiologico-pathological side of the problem, it would appear in our present state of knowledge that the virus of vaccinia of itself cannot be considered responsible for the supervention of encephalitis. Rather it has to be supposed that some unknown factor exists—perhaps bacterial or a filter-passing virus, or a latent virus—which, by means of a reciprocal reaction, determines the occurrence of the accidents in question.

None of the facts considered in this report lead the Commission to the conclusion that there is reason for discontinuing the use of vaccination, which remains the most powerful weapon against small-pox that we possess.

In view of the circumstances associated with the occurrence of nervous complications which, as explained in the first part of this report, are in any case of extreme rarity, the Commission draws attention to the advantage which may result from practising primary vaccination during early infancy rather than at later ages of childhood.

HALF A MILLION FOR HOSPITALS.—To celebrate his seventy-eighth birthday in December next, Mr. Bernhard Baron, the cigarette manufacturer, has created a trust and endowed it with £575,000 four per cent. Consolidated Loan, to be called "The Bernhard Baron Charitable Trust for Hospitals and Asylums for Orphans and Crippled Children." The trust is to endure for 20 years, and the trustees are to apply annually as nearly as possible an equal proportion of the capital and income to the prescribed purposes. Twenty-five per cent. of the money is to be distributed among institutions under Jewish control. Lord Reading is the chairman of the trustees.

BERLIN.

(FROM OUR OWN CORRESPONDENT.)

Predestination to Medical Study.

AT the opening of the new home of the Cologne Medical Society, Prof. Moritz read a paper on the qualities which predestine men and women to take up medical work. He agreed with the views of the late Prof. Garré, of Bonn, who discerned two types among mankind—the auditive and the visual. The latter have an open eye for the world of phenomena, whereas those of the auditive type form their views from the written or spoken word. Prof. Moritz said he had written, on the one hand, to nearly all the medical professors at the German universities, and, on the other, to professors of theoretical sciences such as history, philosophy, archæology, and mathematics, asking them to let him know what had been their favourite subjects at school. He wanted to know whether in their matriculation examination they had got high marks in natural science, whether they had shown interest in physical experiments, or whether, as a sign of an auditive disposition, they had easily learnt their lessons by heart. The answers showed that the medical professors when schoolboys belonged rather to the visual type than to the other, whilst the professors of theoretical sciences had an auditive make-up. The medical men had done well in physics and chemistry, and had shown a taste for experiment, collecting, and observation. As only 8 per cent. of the medical men did not belong to that type, Prof. Moritz concluded that the born naturalist and medical man early shows his predilection for visible phenomena and for experiments, and this later helps in his medical training.

Scarlet Fever and the Potato.

A Berlin medical man, Dr. Benda, the author of essays on the influence of weather and social conditions on the incidence of scarlet fever, has now been studying the possible relation between scarlet fever and the consumption of potatoes. The disease first became known, he points out, at the time when the potato was originally imported into Europe—namely, in the middle of the sixteenth century—and it remained very rare until the beginning of the nineteenth century when potatoes began to be consumed in larger quantities. In Prussia at the present day, he finds, 68·6 per cent. of the potatoes come from the six eastern provinces, and only 31·4 per cent. from the western provinces, and he thinks it significant that on the average the eastern provinces have a scarlet fever mortality of 2·56 per 10,000, as compared with 1·14 in the west. In the individual provinces he has noted that good potato harvests coincide with an increase in the mortality from scarlet fever, and he is of opinion that the consumption of this vegetable favours the development of scarlet fever, although other factors, such as the weather and the density and social standing of the population, should not be overlooked. In support of this view he points out that in countries where potatoes are cultivated very little or not at all scarlet fever is very rare, and these facts make him suggest that the virus may be present in the tubers. A similar theory has been elaborated in connexion with certain epidemics which have broken out in barracks, asylums, and other institutions after the consumption of potatoes, and which were originally ascribed to solanin poisoning. They are now regarded in some quarters as possibly due to the presence in the potatoes of the toxins of *Bacillus coli*, *B. proteus*, and other micro-organisms.

Chimney-sweeps' Cancer.

Chimney-sweeps' cancer has completely died out in Germany, according to an article written by the secretary of the Chimney-sweeps' Association. Nevertheless, this disease is still mentioned in recent works on occupational diseases, and is included in the schedule to the recent law on compensation for professional diseases, together with lead, mercury, and other forms of poisoning. The writer is of opinion that the progress of hygiene, especially improvement in washing facilities, has contributed to the disappearance of the disease. In England, he says, chimney-sweeps' cancer still exists, but perhaps this is because the soot from English coal is more irritating to the skin than German soot.

Legal Responsibility for the Mistakes of Locum Tenents.

The question whether a medical practitioner may be held responsible for malpraxis by his locum tenent has lately been decided in the affirmative by the High Court of Leipzig. A medical man had been absent on a holiday and had appointed a locum tenent with a fixed salary on condition that he should attend the patients designated to him by his employer's wife. A patient had telephoned to the doctor's house to say that he had broken his arm, and wanted attention. The defendant's wife answered that he would come at once, but eventually sent the locum tenent. As the treatment given was alleged to have had damaging results, the patient brought an action against the medical man because he had suffered at the hands of his representative. After a long law-suit the High Court found for the plaintiff, on the ground that the locum tenent had acted as the agent of the defendant, and the latter as principal must be held responsible for the mistakes made. The defendant had pleaded that the locum tenent, as a medical man, was completely independent in his treatment, but this argument was not approved by the court.

Scarcity of Bodies for Dissection.

Human bodies destined for anatomical studies are somewhat scarce in certain universities. The laws and regulations on the subject differ in the various German states, but as a rule the bodies of unknown persons and of criminals who have died in penitentiaries are taken to the anatomical institutes. In the case of prisoners this does not happen if the relatives declare themselves ready to pay the expenses of burial. The anatomical institute of the University of Jena has now published an appeal to the public to send bodies for dissection; they say that the corpses are not mutilated, students being instructed to spare the feelings of the relatives. It is pointed out that many great men—for instance, the late Prof. Häckel—have left their bodies to the institute, and there is no reason why other people should not follow their example. The offer is made that where the body is sent for dissection, cremation will be done free of charge, a religious service will be held if desired, and the ashes will be sent to the family.

Periodica Medica.

The Association of the German Medical Press has issued a catalogue of medical journals, reviews, and other periodicals with the abbreviations to be used in citations. This catalogue, which is entitled Periodica Medica, includes the full and abbreviated names of 1800 periodicals, and it will now be enlarged by adding the more important journals of the profession abroad. The work has been carried out by Dr. Kunze, librarian of the former Army Medical College.

Enteric Fever in Potsdam.

An epidemic of enteric fever has broken out in Potsdam and its neighbourhood. By careful investigation it has been ascertained that it started in a milkshop where an employee had suffered from so-called influenza but was eventually found to have had enteric fever. Fifty cases have been reported with three deaths. The milkshop was, of course, closed, and the milkman and the other patients isolated in hospital. The epidemic has since made no progress, and it is hoped that no new cases will occur.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

The Dublin Hospitals.

A DISCUSSION concerning the financial condition of the Dublin voluntary hospitals has been carried on in the *Irish Times* during the past week. It began with an unsigned contribution from a correspondent who had made a careful study of the income and expenditure of five of the smaller general hospitals for quinquennial periods before the war and recently. The five hospitals studied have an aggregate of about 600 beds. The total expenditure for the years 1909–13 was £192,000; for the years 1922–26, £367,000. Some of the expenditure was for new buildings or structural alterations, but the correspondent points out that with the advance of medical and surgical technique such changes become frequently necessary, and the expense may properly be classed as ordinary. The annual expenditure has varied little from 1922 to 1926. The income comes from various sources—pay-patients, subscriptions, dividends from invested funds, grants from the Hospital Sunday Fund, the Corporation of Dublin, the Government, and some payments for special services. Some of these sources are discussed in detail. The payments from patients have increased twelvefold from the one quinquennial period to the other. In 1909–13 a sum of £10,315 was collected from patients; in 1922–26 the amount was £120,258. It may be assumed, therefore, that as far as the hospital itself is concerned hospital abuse in the old sense has disappeared. But there is a tendency for a new abuse to appear. This lies in the fact that there is often a difficulty in obtaining a place for a patient who is not able to contribute to the cost of his maintenance.

Paying Patients.

The correspondent next draws attention to the fact that the recognition in the hospitals of a class of pay-patients has led to a change in the relation of the members of the staff to the patients. Formerly members of the staff invariably gave their services gratuitously to all their hospital patients. Now, in some hospitals, it is becoming the custom for members of the staff to accept fees from those who can afford to pay. It is suggested that this custom may lead in time to the disappearance of nursing homes and the concentration of all patients in general hospitals or in homes attached thereto. The amount of money raised in subscriptions increased from £64,000 in 1909–13 to £76,000 in 1922–26. There was, however, a decline in the case of some hospitals, and the increase is in part due to special appeals in recent years. But, as the correspondent drily remarks, "special appeals are among the recognised methods of obtaining hospital funds." The income from investments has increased from £9000 to £10,000: or, in other words, the actual investments have been increased by about £20,000. The combined overdraft of the five hospitals is about £40,000. The correspondent thinks that if this could be wiped out these hospitals could carry on satisfactorily on the present basis, and approximately balance their budgets. In conclusion, he states that there are not more hospital beds in proportion to the population in Dublin than in other centres, and that every hospital has a waiting-list.

A Plea for State Aid.

This communication has been followed by the publication of interviews with several hospital physicians and surgeons. Sir William Taylor puts in a plea for State aid, though he does not desire State control. He suggests that amalgamation of the smaller hospitals would be advantageous to the public, but it would require a capital sum of roughly £700,000. Sir Thomas Myles suggests that the demand on the Dublin hospitals might be considerably lessened if the country hospitals were fitted to do work of a wider range than at present. Nowadays most of the country hospitals have a staff of only one surgeon, so that work must needs be very limited in scope. Mr. Horace Law draws attention to the tax on hospitals constituted by industrial accidents and by the increasing number of motor accidents. He suggests that workmen should contribute to the hospitals through their trade-unions. Sir John Lumsden, while recognising the necessity of accepting payment for maintenance from patients, emphasises the need for making sure that the poor are not excluded. Every voluntary hospital should reserve a number of free beds. Mr. Louis Cassidy suggests the adoption of a scheme of combined marketing, and puts in a plea for provision for research work in the hospitals. Sir William Wheeler thinks that several of the hospital buildings have outlived their usefulness, and are far behind what might be expected in a university city. He urges that children should be removed from the city hospitals to country air.

Medical Certification for National Health Insurance.

Medical certification of insured persons for sickness benefit has had severe criticism at a recent meeting of the Executive Committee of the Approved Societies' Association. Attention was drawn to figures obtained from the National Health Insurance Commission as to the results of the work of the medical referees in the year 1927. It appeared that 13,395 applications had been made to the Commission to provide a second opinion. Of these, 409 were rejected as unsuitably elected and 581 presented final certificates before examination took place. Of the remainder, 4410 failed to attend for examination, about half of them declaring off benefit and the other half ignoring the summons. The remaining 7993 were examined by the medical referees. In regard to 3200 (40 per cent.) the referees found the claimants not incapable of work, while 4793 (60 per cent.) were found incapable and entitled to benefit. The society officials appear to think that these figures disclosed serious laxity in the issue of certificates. Before arriving at such a conclusion it would be necessary to know what proportion these certificates bore to the total number issued. It is wrong to assume that all who declined to attend for examination by the referee did so because they had been acting in fraud. Many sick people will go without benefit rather than take trouble to get it, and many go to work when they should not. That 60 per cent. of the cases thought doubtful by the society officials which actually came to examination by the referee should have been upheld by him is evidence of fairly accurate certification. It was suggested by the secretary of one society that certificates were sometimes issued without examination. If this is done it is liable to the severest professional censure.

Proposed Change of Unit for Distribution of Payment.

While the approved societies are criticising the system of medical certification from one point of view, the National Health Insurance Commission is proposing to make an alteration which is likely to render the system more open to abuse. When the present system was adopted about 13 years ago it was arranged that the dispensary district should be the unit of distribution of payment. A sum equal to the number of insured persons living in the district multiplied by the agreed capitation rate was assigned to each district, and this pool was then distributed according to the work done to the several practitioners who furnished certificates in that district. The Commission now proposes to substitute the county for the dispensary district as the pool unit, on the grounds that the smaller unit leads to widely divergent rates of remuneration, and that the difficulty and expense of obtaining accurate figures of the number of insured persons in the dispensary districts is very great.

Large or Small Units.

It is somewhat surprising that with 13 years' working of the system the Commissioners and the societies have been unable to get a satisfactory register, showing the dispensary district in which each

insured person resides, compiled. If such a register were prepared the other objections fall to the ground. The Commission has invited all medical certifiers to agree to the proposed change, but, on the other hand, the chairman and secretaries of the Irish Medical Committee have asked certifiers to take no steps until the local medical committees and the Irish Medical Committee have considered the matter. It has to be recognised that the substitution of a large pool area for a small one abolishes important checks on excessive certification. In a dispensary district pool the great bulk of the pool—probably 80 or 90 per cent.—is likely to go to the dispensary doctor in any event. He is unlikely, therefore, to be tempted to issue certificates in excessive numbers. Moreover, where only a few men share in a pool they act as checks on each other, and it would be difficult for one of them to secure an undue share without rousing the suspicion of the others. In a large area such as a county these checks disappear. An unprincipled certifier, if such there be, has the way open to him to act unfairly by the pool by issuing excessive numbers of certificates.

BUDAPEST.

(FROM OUR OWN CORRESPONDENT.)

Increase of Bastardy.

Dr. Lajos Neményi has been propounding to the Royal Medical Society the question whether the community would not benefit if the same opportunities for development were given to illegitimate children as to those who are born in wedlock. He does not regard the illegitimate birth-rate as any index of the state of morality. This rate has been rising generally in the years since the war, and in Hungary the proportion of illegitimate children in 1925 reached the relatively high figure of 8·2 per cent. Last year nearly 5 per cent. of the pupils at the State auxiliary schools in Budapest were illegitimate. Examination of the patients in the State asylum at Angyalföld shows that general paralysis of the insane is much commoner among women of this class, which is not surprising in view of the inferiority of the education and discipline which they usually receive as girls. Other forms of mental disease do not seem to occur especially often among the illegitimate, and they do not appear to be degenerate by heredity.

Conservative Treatment of Surgical Tuberculosis by Zinc Sulphate.

A preliminary account has been published by Dr. Nikolaus Hedry of his extensive experiments with zinc sulphate in various forms of surgical tuberculosis —e.g., abscesses, caries, fistulæ, and coxitis. After referring to the increase of surgical tuberculosis due to deplorable economic conditions since the war, he goes on to speak of conservative treatment by sunlight, ultra-violet rays, and heat rays. None of these, however, has proved so helpful as zinc sulphate, which he has been experimenting with since the spring of 1926. A 10 per cent. glycerinated solution is employed, and with this it is possible to get complete sterility in abscesses. The infected tissues shrink under the astringent action of zinc, and no harmful incidental effects have been observed in the course of the treatment, apart from a slight inflammation which accompanies the changes in the tissues. In rare cases the patients have complained of shivering and pains, but these were of short duration. Besides many other lesions, six tuberculous fistulæ were treated by irrigation with 1–5 per cent. sulphate of zinc solution, followed by the application of 15–20 per cent. sticks. In three cases the fistulæ were completely closed, and in two there was a considerable improvement; the remaining one showed no benefit. According to Hedry, the particular advantages of the method are as follows. Sulphate of zinc is highly antiseptic, even in high dilution; it is an efficacious astringent, and has a specially stimulating action upon tuberculous tissues, whereby cold abscesses are transformed into warm ones. Its use causes no untoward consequences in the neighbouring healthy areas, even when a strong solution is employed, and no cumulative after-effects have been noted during the two years during which the method has been adopted on a large scale.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

To be Surg.-Lts.: M. A. Graham-Yooll, J. G. Paley, E. W. Graham, R. G. E. Richmond, H. P. Williams, and H. S. Marks.

Surg. Lt.-Comdr. S. R. Johnston to *Caradoc*, for duty during trials.

ROYAL NAVAL VOLUNTEER RESERVE.

Surg. Sub.-Lt. D. S. Buchanan to be Surg. Lt.

Proby. Surg. Sub-Lt. T. C. Larkworthy promoted to Proby. Surg. Lt. and appointed to R.N. Hospl., Haslar, for 28 days' training.

Lt.-Comdr. J. H. Anning to *Pangbourne*, for disposal for training.

Proby. Surg. Sub-Lt. J. D. J. Freeman to *Renown*, for training.

ROYAL ARMY MEDICAL CORPS.

Col. N. J. C. Rutherford retires on ret. pay.

Lt.-Col. and Bt. Col. P. H. Henderson to be Col., vice Col. A. Chopping, to ret. pay.

Lt.-Col. B. F. Wingate retires on retd. pay.

The undermentioned Lt.-Cols., having reached the age limit for compulsory retirement, retire on retd. pay: G. J. Houghton (and is granted the rank of Col.), and C. H. Carr.

The undermentioned Majs. to be Lt.-Cols.: G. B. F. Churchill, F. E. Roberts, and E. G. R. Lithgow.

Maj. T. W. O. Sexton, Reg. Army Res. of Off., relinquishes his appt. under Art. 507 (b) Royal Warrant for Pay and Promotion, 1926.

Lt. C. L. Day is restd. to the estabt.

ARMY DENTAL CORPS.

To be Lts. (on prob.): H. L. Foulkes-Roberts, T. R. Wall, J. A. O'Connor, and H. S. Golding.

ARMY RESERVE OF OFFICERS.

Maj. A. F. L. Shields, from R.A.M.C., T.A., to be Maj.

SUPPLEMENTARY RESERVE OF OFFICERS.

Lt. H. L. Oldershaw to be Capt.

TERRITORIAL ARMY.

Lt. A. A. Eagger (late Gordons) to be Lt.

ROYAL AIR FORCE.

Flight Lt. J. Hutchieson is granted a permanent commission in this rank.

RESERVE OF AIR FORCE OFFICERS.

Flying Officer E. D. Gray relinquishes his commission on completion of service.

INDIAN MEDICAL SERVICE.

Col. H. Boulton to be Maj.-Gen.

Lt.-Col. J. Fuller-Good to be Col.

Majs. to be Lt.-Cols.: W. D. Keyworth, B. Gale, H. H. King, R. E. Flowerdew, and A. J. Symes.

Capt. to be Maj.: H. H. Elliot.

Lt. Bhagwant Singh Nat to be Capt. (provl.).

Temp. Capt. Bhanu Datta Sharma relinquishes his tempy. commn.

NORTH PERSIAN FORCES MEMORIAL MEDAL.

Dr. W. H. Dye, Colonial Medical Services, has been awarded the North Persian Forces Memorial Medal for the year 1927 for his paper, The Relative Importance of Man and Beast in Human Trypanosomiasis, published in the Transactions of the Royal Society of Tropical Medicine and Hygiene (1927 vol. xxi). The medal is awarded annually for the paper on tropical medicine or hygiene that has attained a standard of merit published in any journal during the preceding 12 months by a medical officer, of under 12 years' service, of the Royal Navy, Royal Army Medical Corps, Royal Air Force, Indian Medical Service, or of the Colonial Medical Service.

Correspondence.

"Audi alteram partem."

OBTAINING A SPECIMEN OF SPUTUM.

To the Editor of THE LANCET.

SIR,—In his practical and authoritative article last week (p. 614) Dr. S. R. Gloyne states that it is not uncommon for saliva and stomach contents to be sent to the laboratory as sputum. A negative report may under such circumstances be accepted as valid, when a reliable specimen might be found to contain tubercle bacilli. The issues at stake are of such vital importance that I may be permitted to draw attention to some methods that I have employed for the purpose of obtaining a trustworthy sample.

1. *Coaxing* is often effective and may be practised while gently holding the patient's head down over a basin and urging him to "clear his chest and shoot the phlegm out into the basin," while at the same time giving a good cough one's self for him to imitate.

2. *Inhalation of mustard-oil vapour* is of the greatest value. A few drops of the oil in a six-ounce bottle are slightly warmed over a lamp and the patient is asked to have a good sniff or two from the mouth of the bottle. This rarely fails to induce a cough-reflex, especially if there is any inflammatory or tuberculous affection of the larynx. With this I have often obtained a "positive" report when repeated previous ones had been "negative."

3. *Intralaryngeal injection* of a few drops of warm 1 per cent. solution of bicarbonate of soda with a trace of solution of peroxide of hydrogen, as used for cleansing the larynx, may succeed when the mustard inhalation fails.

4. *Trans-nasal instillation* of similar drops may serve the same purpose and requires no "special" technique. The patient sits with his head thrown back and his mouth open. He is instructed to keep on panting and not to swallow while a few drops of the solution are poured into the nose by means of a simple glass syringe. Sufficient is likely to find its way into the larynx to excite a cough and induce free expectoration. This is a method of great value for the introduction of antiseptic oil into the larynx and trachea.

5. *The laryngeal mirror* may serve for the reception of a patch of sputum if the patient coughs while it is in situ.

6. *Potassium iodide*, in small doses, administered for a few days if not otherwise contra-indicated, will often increase the expectoration and bring up the latent bacilli.

It is obviously in the less advanced cases that these methods are called for.

I am, Sir, yours faithfully,

London, Sept. 25th, 1928. JAMES DUNDAS-GRANT.

A CASE RESEMBLING ADDISON'S DISEASE TREATED WITH PITUITARY EXTRACT.

To the Editor of THE LANCET.

SIR,—I can now report the sequel of this case, published in THE LANCET (1928, i., 79). After having derived great apparent benefit from pituitary extract, the patient left this district for South Wales, taking with her a supply of the pituitary tabloids. A fortnight after the supply was exhausted—so I am informed through a relative—she died. I have seen a copy of the death certificate which states "Tuberculosis of the Suprarenal Capsules," not confirmed by autopsy. This is all the information I have been able to obtain, but it appears to confirm the fact that great benefit may be conferred in Addison's disease by administration of pituitary extract.

I am, Sir, yours faithfully,

Merioneth, Sept. 19th, 1928. E. C. B. IBOTSON, M.D.

DEATHS UNDER ANÆSTHETICS FOR DENTAL OPERATIONS.

To the Editor of THE LANCET.

SIR,—Under this heading you called attention last week to an inquiry by the *Dental Surgeon* designed to reduce still further the number of deaths during dental operations. To my mind a lower percentage of deaths in this type of operation must be looked for along the lines of an improved technique on the part of the anæsthetist. If the following three incontrovertible facts are borne in mind it will be seen how large a responsibility rests with the administrator, and how important it is that he should be sufficiently expert to deal adequately with what may prove to be a very difficult administration :—

1. The operation though previously estimated to be of a trivial character and requiring the maintenance of anæsthesia for only a few minutes, frequently devolves itself into a much more arduous affair, requiring a tranquil anæsthetic period of possibly half an hour.

2. In so many cases a partial or even complete obstruction of the upper air passages occurs at some stage of the operation, and in the vast majority this obstruction is brought about by : (*a*) the gradual and increasing collection of blood at the back of the throat ; (*b*) the necessary manipulations of the operator's fingers in the mouth pressing back the tongue ; (*c*) the extraction of a difficult tooth in the lower jaw, entailing as it so often does undue depression of the chin. The dental surgeon is fully conversant with conditions (*a*), (*b*), and (*c*), and has been rather brought to believe that a "rush policy" answers best—i.e., to continue operating until the last possible moment, knowing from unhappy experience that should he be compelled to desist the chances are extremely remote that more favourable conditions will supervene, as upon his resumption a restless patient may still further increase his difficulties.

3. The method of administration chosen frequently necessitates the reapplication of a closed ether inhaler or the dropping of chloroform on an open mask, owing to the patient's partial return to consciousness. In either case the process of reinduction in an oftentimes restless and cyanotic subject choked with his own blood is fraught with danger, and is to be condemned.

It seems to me, therefore, that the lessening of the anæsthetic risk must be looked for along the lines of a better understanding and firmer handling of the issues involved in the above three factors. With regard to (1) all dental operations in which a general anæsthetic is required should automatically (from the anæsthetist's point of view) be relegated to the same class as other major operations performed upon the mouth and which, by their nature, are likely to give rise to interference with the upper air passages. Only by a frank recognition of this point shall we be able to obtain the same pre-operative routine care and attention in the preparation of the patient as obtains in the other cases under this category. All the well-known arguments cited in favour of preliminary hypodermic medication with morphine and atropine apply with especial force in prolonged anæsthesia for dental operations, and the exhibition of these drugs should be part of the routine treatment.

With regard to (2) and (3) I have employed the following technique with a reasonable freedom from anxiety and with no fatality in well over 1000 cases of multiple extractions : induction by gas-ether or ethyl-chloride-ether sequence with a Clover's inhaler. After induction has been completed, usually in two or three minutes, a further three minutes or so is never wasted in continuing with the closed apparatus, until a condition of "stable anæsthetic equilibrium" has been established. A change-over can now be quickly made to a Shipway's inhaler ; the Shipway has been previously connected up with an oxygen cylinder, and the oxygen flow so regulated as to drive over sufficient anæsthetic vapour as previous experience has deemed sufficient to maintain anæsthesia. The narrow efferent rubber tube of the Shipway is wriggled well back to the posterior nares and retained in place by a metal clip attaching it to the ala nasi. Anæsthesia can now be prolonged indefinitely by the judicious administration through the nasal tube of either pure ether, ether-chloroform, or even pure chloroform

without altering the uniform flow of oxygen. Cyanosis should rarely take place owing to the relatively large proportion of oxygen passing over; this latter factor enables a temporary obstruction of respiration to occur without any change of colour on the part of the patient. The operator need never be hurried by the thought of the patient's impending return to consciousness, and in consequence is not so reluctant to allow the anæsthetist to keep the operating field reasonably free from blood, with undoubted advantage both to himself and the patient.

One last word: It cannot be too strongly emphasised that no extraction should be continued with in the presence of an even moderate degree of duskiness; all operative interference should be postponed until the normal colour has been restored.

I am, Sir, yours faithfully,

ARTHUR V. BOYALL.

Minehead, Somerset, Sept. 24th, 1928.

THE LATER RESULTS OF PARTIAL GASTRECTOMY FOR GASTRIC AND DUODENAL ULCER.

To the Editor of THE LANCET.

SIR,—Mr. Flint criticises me for saying that "in our experience gastro-enterostomy is the commonest gastric disorder to-day" in view of the fact that I had given figures showing that duodenal ulcer was a still more common condition. But surely duodenal ulcer is a disease of the duodenum and not of the stomach. I have had many cases of gastro-jejunostomy undone in the absence of anastomotic ulcer in order to overcome more or less severe symptoms resulting from the disordered function caused by the operation, which had generally, though not always, been performed for an ulcer. I may add that in several cases the secondary operation was performed by a distinguished Leeds colleague of Mr. Flint.

There is now abundant evidence that duodenal ulcers rarely, if ever, develop in the absence of what I have called the hypersthenic gastric diathesis. This condition is still present after a duodenal ulcer has healed, whether as a result of medical treatment, a gastro-jejunostomy or partial gastrectomy. It is for this reason that none of these measures is likely to lead to *permanent* freedom from symptoms unless the patient follows a suitable régime for the rest of his life. Mr. Lake is asking for trouble if he allows his patients to eat ordinary food, even after six months. That is why I suggested that he would find the last results of his operations very different from what he calls the "late results"—i.e., the results after an interval of only one to five years. I have seen several cases of secondary ulceration after partial gastrectomy and have collected over a hundred from the literature.

Mr. Lake asks what I could suggest as an alternative to gastrectomy for "those cases in acute agony who have already had a succession of medical treatments with almost immediate recurrence." My answer is that there should be no such cases. The acute agony should disappear within 48 hours of beginning treatment, and if this is continued till the ulcer has really healed and not simply until the symptoms have disappeared, if all septic foci are eliminated, and if a proper régime is followed afterwards, the risk of recurrences is small. When they do occur they are far more amenable to treatment than the disasters which may follow gastric operations. Moreover, the mortality is nil, compared with Mr. Lake's mortality of 10 per cent. after partial gastrectomy for ulcer.

It is true that men and women of the labouring class do not come to New Lodge Clinic, but they come to Guy's as often as to Charing Cross. If Mr. Lake will send me his next three cases of the kind to Guy's, I should greatly value the opportunity of demonstrating to him my alternative to partial gastrectomy.

I am, Sir, yours faithfully,

ARTHUR F. HURST.

New Lodge Clinic, Windsor Forest, Sept. 24th, 1928.

THE NATURE OF THE ROUS TUMOUR.

To the Editor of THE LANCET.

SIR,—A leading article last week states that "the essential similarity between the reaction of the Rous tumour to irradiation and that of true mammalian new growths is evidence in support of the fundamental similarity of these two types of neoplasms." Surely the experiments referred to in this article show some striking *dissimilarities*. Mottram irradiated small Rous tumours in fowls with doses which he calculated would cause their ultimate disappearance. When the tumours had begun to regress, they were removed and dried in vacuo, but when reinoculated into fowls produced tumours. Could any true mammalian new growth have stood such treatment?

Although we gave Rous tumours in vitro five times the dose of X rays lethal to mouse, rat, and human tumours of various types, it had no apparent effect on the subsequent growth; surely this points to some dissimilarity in the Rous tumour. Mottram found that a small nodule of Rous tumour in a fowl could be made to disappear if it was exposed to a certain dose of irradiation, while we found that a dose of X rays lethal to other tumours had apparently no effect on an established Rous tumour in a chicken. Under the conditions of Mottram's experiment the surrounding normal tissues would get a dose of irradiation not very different from the tumour cells; under our conditions they would get only a small fraction of this dose.

In the *British Journal of Radiology* (1927, xxxii., 289) we published experiments showing the deterrent effect which suitable doses of X rays on the skin of the rat had on subsequent tumour-growth, when the tumour cells received no irradiation whatever.

We are, Sir, yours faithfully,

S. RUSS,
G. M. SCOTT.

The Middlesex Hospital, W., Sept. 24th, 1928.

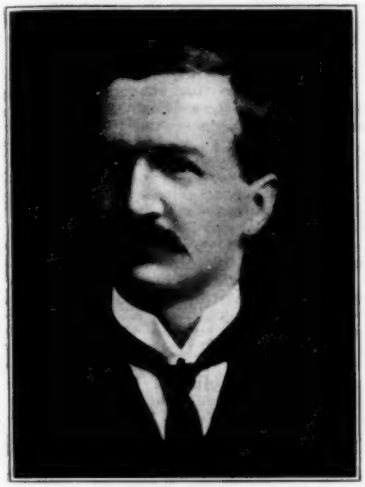
IMPORTATION OF DRUGS AND CHEMICALS.—Under Section 10 (5) of the Finance Act, 1926, the Treasury may by order exempt from the duty imposed by the Safeguarding of Industries Act, 1921, any article which is not made in any part of His Majesty's Dominions in quantities which are substantial having regard to its consumption in the United Kingdom, provided that there is "no reasonable probability that the article will within a reasonable period be made in His Majesty's Dominions in such substantial quantities." The Board of Trade has under consideration the renewal of the exemption which has been accorded to the following substances and articles: R. acetone; acetone (fermentation); synthetic acetone; anhydrous hydrocyanic acid; lactic acid which satisfies the requirements of the British Pharmacopœia; oxalic acid; amidopyrin (pyramidon, dimethyl-amidoantipyrine); ammonium perchlorate; barbitone (veronal; malonal; malourea; diethyl barbituric acid; diethylmalonylurea; hypnogen, deba); bromural (dormigene); crude cocaine; dial (acid diallyl barbituric); didial (ethyl morphine diallyl barbiturate); elbon (cinnamoyl para oxyphenyl urea); ethylene bromide; ethylene glycol (glycol; alcohol ethylene); eukodal; furfurol; glycol ethers; guaiacol carbonate (duotal); hydroquinone; integrators (planimeter type); R. lead acetate; lead tetraethyl; lipoidin; lithium carbonate; lithium hydroxide; metaldehyde; methyl chloride; methyl sulphonal (diethylsulphonemethylethylmethane, trional); nickel hydroxide; papaverine; phenacetin (acetparaphenetidine); phenazone (antipyrine; phenyldimethylpyrazolone; analgesin; anodynine; dimethyl oxychinizin; phytin; piperazine (diethylene-diamine; dispermin); planimeters; R. potassium chlorate; potassium guaiacol sulphonate (thiocol); R. potassium hydroxide (R. potassium caustic; R. potassium hydrate); R. potassium permanganate; pyramidon-veronal; quinine ethyl-carbonate; radium compounds; resorcin (resorcinol); salol (phenyl salicylate); styracol (guaiacol cinnamate); sulphonal; synthalin; urea (carbamide); and vanadium-silica compounds specially prepared for use as catalysts for sulphuric acid manufacture. Any communications with respect to these matters should be addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George-street, London, S.W. 1, before Oct. 18th.

Obituary.

ROBERT KNOX, M.D. EDIN., M.R.C.P. LOND., D.M.R.E. CAMB.

BY writing, by organisation, and by example Dr. Robert Knox played an important part in the development of radiology in this country. His death, which occurred in London on Sept. 21st, will be generally regretted by the profession, and especially by those who knew him as a colleague and friend.

Born at Leith in 1868, he received the same name as his father. He was sent to the University of Edinburgh, and graduated there in medicine when 24 years of age. After acting for a time as demonstrator of anatomy in the New School of Medicine at Edinburgh he came south to Guy's Hospital, taking the English conjoint diploma in 1893. A year or two later he settled in general practice at Highgate, but continued his hospital work at the Great Northern Hospital where he first held appointments in the pathological and medical outpatient departments. He began to study radiology within a few years of Rontgen's discovery, and gradually radiological work began to absorb more and more of his time and interest. His first radiological or rather "electrical" appointment was to the Great Northern Hospital, and in 1909 he began his long series of contributions to the literature of the subject. In 1912 he was appointed director of the electrical and radiotherapeutic department of the Cancer Hospital, and began to specialise at Harley-street as a radiologist. In the following year he succeeded Dr. (afterwards Sir) Archibald Reid as radiologist to King's College Hospital. Soon afterwards he followed Dr. F. H. Low as honorary secretary of the Rontgen Society, being also elected to the Council of the Electrotherapeutic Section of the Royal Society of Medicine. Knox was a ready and rapid writer with a good sense of proportion and an eye to effective illustration. His text-book, "Radiography, X Ray Therapeutics, and Radium Therapy," which appeared in 1915 within one cover, was the first comprehensive treatment of the whole subject by a British author. It was an immediate success, which was justified by Dr. Knox's scrupulous care in keeping later editions of the book in touch with every new development. His other literary work included the chapter on Radium Therapy in Eden and Lockyer's Gynæcology and papers in many periodicals, whilst for years past he has been editor of the *British Journal of Radiology* and its predecessor.



DR. KNOX.

His chief radiological researches were done at the Cancer Hospital, Fulham. In the laboratories attached to this department some new device was always being worked at; in radio-diagnosis he was especially interested in developing means whereby accurate information of the heart's movements might be got, and he did a great deal to encourage serial radiography. On the radio-therapeutic side he made a definite attempt to reduce the damage to the skin which may occur when depth doses are administered, and here again by his method of rotational focus a step forward was made. An account of some recent work on the reactions of normal and pathological tissues, carried out in association with the British Empire Cancer Campaign, was given to the Second International Congress of Radiology, held at Stockholm last July.

Dr. Knox helped to found the British Association of Radiology and Physiotherapy, and with Sir Archibald Reid was also the founder of the British Institute of Radiology. He was president of the former and also of the Rontgen Society, and when the Rontgen Society was recently amalgamated with the Institute he was able to give much help to those responsible for the change. Dr. George Batten, who followed Knox as president of the Rontgen Society and the Section of Electrotherapeutics of the Royal Society of Medicine, writes of him that he was a ruling spirit, if not *the* ruling spirit, in these associations. "The Council and members," writes Dr. Batten, "as well as his colleagues at the hospitals, quickly learnt to appreciate Robert Knox for his broadmindedness, thoroughness, and ballast, and we all learnt to love this quiet, modest, efficient man. He brought to bear on every problem of patient or policy a friendly dignity which produced calm and good results."

Another colleague writes of him that he was always ready to recognise the help received from his staff, members of which, attracted by his personality, often gave their services without payment.

Abroad Knox was probably the best-known British radiologist, and he was elected to honorary membership of several foreign societies, including the American Roentgen Ray and Radium Society. It is not too much to say that it was owing to his initiative that the first International Congress of Radiology was held in London in 1925. During the war he was in charge of the X ray department of the 4th London General Hospital, holding a Territorial commission, and for many years was honorary radiologist to the Queen Alexandra Hospital, Millbank. He had recently been acting in an advisory capacity to the War Office and to the Ministry of Health.

He leaves a widow, Dr. Alice Vance Knox, a daughter, and a son Robert, who is studying medicine at St. Bartholomew's Hospital.

ARCHIBALD DUNBAR WALKER, M.D. EDIN.

WE have to announce that Dr. Dunbar Walker, who was for more than 43 years in active practice in the London area, died at his home in Hampstead on Sept. 21st, at the age of 81. His father was a surgeon in the service of the East India Company, and Dr. Walker was born in India. He received his medical education at the University of Edinburgh, where he graduated in 1861 and gained his doctor's degree in 1871. Soon after qualifying he went out to Palestine to undertake medical mission work, spending also some time in Egypt. On his return to this country he took up general practice in Ladbroke-grove, being appointed medical officer to the North Kensington and Kensal-town Provident Dispensary. After 25 years in this district he moved to Notting Hill, where he remained actively at work for another 18 years. Dr. Walker was the author of "Egypt as a Health Resort" and "The Parents' Medical Note Book," besides a number of contributions to the medical press. His sister was Dr. Eliza Walker Dunbar, who long practised in Clifton and died two years ago, and his son is Lieut.-Colonel N. Dunbar Walker, R.A.M.C., another member of the family who sustains its medical tradition.

ALICE DEBORAH HICKLING, M.B.E., L.R.C.P. EDIN.

Mrs. Hickling, who has died at Hong-Kong, was a daughter of the Rev. James Sibree and was born in the Madagascar mission field in 1876. She entered Walthamstow Hall, Sevenoaks, as a young child, and

went up to Oxford in 1894, qualifying from the London School of Medicine for Women in 1901 with the Scottish conjoint diploma. After some two years' experience as resident medical officer at the Sanatorium for Consumption at Clare, in Suffolk, she went out to Hong-Kong to join the staff of the Alice Memorial Maternity Hospital. Shortly afterwards she became Government inspector of midwives in the colony, a post which she held for 20 years. During the war she was medical officer to the Voluntary Aid Detachment in Hong-Kong, and for the last 12 years of her life had been medical officer to the Victoria Nursing Division there. For her services to the colony, in these and other capacities, she was made a Member of the Order of the British Empire, and she was also an honorary serving sister of the Order of St. John of Jerusalem. Dr. Hickling served from 1918 to 1920 as acting medical officer of health for Hong-Kong, and in 1923 was appointed Government assistant medical officer in charge of native hospitals. She married Mr. C. C. Hickling, son of the Rev. James Hickling.

Medical News.

LONDON MEDICAL EXHIBITION.—From Monday, Oct. 1st, till Friday, Oct. 5th, from noon till 6 P.M., at the Central Hall, Westminster, the London Medical Exhibition will be open to members of the medical profession, and any medical man who has not received a card of admission can obtain one on application to the Secretary, 194–200, Bishopsgate, or at the Central Hall during the exhibition week. This exhibition grows in importance and magnitude every year, and it is expected that the forthcoming display of the latest results of research and of aids to medical and surgical treatment will be the largest yet held. Organised by the management of the Seventeenth International Congress of Medicine, 1913, and of the Fifth Clinical Congress of Surgeons, 1914, it aims at presenting a comprehensive survey of drugs and surgical appliances of practical value to the practitioner, while it also enables him to keep in touch with the latest developments of medical and surgical achievement. A large reception room and a refreshment room with orchestra are provided for the use of visitors.

ROYAL SANITARY INSTITUTE.—The Fortieth Congress and Health Exhibition of the Institute will be held at Sheffield from July 13th to 20th, 1929.

Sir John William Thomson-Walker, F.R.C.S., has been appointed a Deputy-Lieutenant for the County of London.

UNIVERSITY OF LONDON.—A course of lectures on Smoke Pollution of the Air and Public Health will be given at University College, Gower-street, London, W.C., by Dr. John Owens, at 5.30 P.M., on Nov. 2nd, 9th, and 14th.

UNIVERSITY OF LONDON MEDICAL GRADUATES SOCIETY.—It is proposed to hold a dinner for members of this society in London towards the end of October, and it is expected that a dinner for members in Birmingham and one for members in Leeds will be held in November. All medical graduates of the University of London are eligible for membership, and nearly 300 life members have so far been enrolled. Applications should be sent to the hon. secretaries of the society at 11, Chandos-street, London, W.1.

ROYAL INSTITUTE OF PUBLIC HEALTH.—The Harben lectures for 1928 will be delivered at 4 P.M. on Oct. 23rd, 26th, and 30th, in the Lecture Theatre of the Institute, 37, Russell-square, W.C., by Dr. Arthur T. Henderson, lecturer in medicine in McGill University, Montreal, whose subject will be Studies in Asthma and Related Diseases. No tickets of admission will be required. A course of lectures on Industrial Diseases will be held at the Institute in the near future.

GERMAN CAMPAIGN AGAINST RHEUMATISM.—The third meeting of the Deutsche Gesellschaft für Rheumabekämpfung will be held under the chairmanship of Prof. Dietrich, at Berlin, from Nov. 4th to 7th. The subject of discussion will be the Clinical Features of Rheumatic Diseases, and there will be lecture-demonstrations at various clinics on the relation of these diseases to the different branches of medicine. The address of the society is Fraunhoferstrasse 16, Charlottenburg, Germany.

MEDICAL RESEARCH COUNCIL: NEW OFFICES.—From Oct. 1st the administrative offices of the Medical Research Council, hitherto at York-buildings, Adelphi, will be at 38, Old Queen-street, Westminster, London, S.W. 1 (Telephone, Victoria 5027). The offices of the Industrial Fatigue Research Board will also be at the new address.

LARGE BEQUEST TO MANCHESTER ROYAL INFIRMARY.—This hospital has benefited to the amount of £36,000 from a bequest by the late Mr. John Whewell Simpson, of Keswick, a director of the Bleachers' Association. This is the largest individual legacy which it has received for more than 50 years.

SALISBURY INFIRMARY LEAGUE.—The membership of the Salisbury and District Infirmary and Hospital League has increased so rapidly that it has been decided to incorporate it as a limited company without capital trading without profit. When the League was reorganised in the spring of 1922 there were 46 centres of collection and 81 collectors; there are now 280 centres of collection, 616 collectors, and over 50,000 members. In 1914 the League handed £76 to the infirmary; last year it paid over £7509.

WELSH NATIONAL MEDICAL SCHOOL.—We noted in THE LANCET of July 28th last that students preparing for degrees and diplomas other than those given by the University of Wales, could not be accepted for courses of instruction in the final subjects. Considerable economic hardship is being caused to students in their fourth year who might not have taken up the study of medicine had they not felt assured that they could pursue it while living at their homes. Moreover, it may not be easy to find vacancies at medical schools for students who have done their preliminary work elsewhere. The situation has arisen quite independently of the dispute as to the future status of the Welsh National Medical School, which is now settled in so far that a draft charter establishing it as a separate school of the University has been adopted by the parties concerned and submitted to the Privy Council. Unfortunately for the prosperity of the school, however, certain members of the staff of the Cardiff Royal Infirmary have resigned their position as clinical teachers, thus diminishing the number of beds available for instruction to such an extent that the University of London and the Conjoint Board have been compelled to withdraw recognition of the school as a teaching centre. Joint representation of the case for the students has been made by the parents concerned to the Board of the Royal Infirmary with no effect. Opposition to the unit system is the alleged cause of the resignations.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY, Oct. 2nd.—8.30 P.M., ORTHOPÆDICS. Presidential Address, Mr. Naughton Dunn: The Surgery of Muscles and Tendons in Relation to Infantile Paralysis. (To be followed by discussion.)

WEDNESDAY.—5 P.M., HISTORY OF MEDICINE. Remarks by the President, Dr. Herbert Spencer. Paper—Sir D'Arcy Power: The Beginnings of the Renaissance of English Surgery. Members are invited to bring objects of historical interest for exhibition at the meetings of this Section.

THURSDAY.—8.30 P.M.: UROLOGY. Dr. Oswald Swinney Lowsley (New York): Perineal Prostetectomy (with cinematograph demonstration). Members of the Section of Surgery are specially invited to attend.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn-fields, W.C.

FRIDAY, Oct. 19th.—5 P.M., Sir Arthur Keith: Problems in Human Anatomy which arise out of the identification of a skull attributed to Lord Darnley—Demonstration, illustrated by specimens.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, Oct. 1st, to SATURDAY, Oct. 6th.—BETHLEM ROYAL HOSPITAL, St. George's-fields, S.E. Tues. and Sat. at 11 A.M.: Lecture-Demonstration on Psychological Medicine. ROYAL FREE HOSPITAL, Gray's Inn-road, W.C.—Lecture-Demonstration by Dr. C. B. Heald on Wed., on Treatment by Electro-Therapy, at 5.15 P.M.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.
MONDAY, Oct. 1st.—10 A.M., Dr. Dowling: Skin Department. 11 A.M., Mr. Tyrrell Gray: Surgical Wards. 2 P.M., Mr. Simmonds: Surgical Out-patients.
TUESDAY.—11 A.M., Mr. Endean: Venereal Diseases (Demonstration). 2 P.M., Dr. Shaw: Medical Out-patients. 2 P.M., Mr. Sinclair: Surgical Out-patients.
WEDNESDAY.—10 A.M., Dr. Burnford: Medical Wards. 2 P.M., Mr. Tyrrell Gray: Operations. 2.30 P.M., Mr. Donald Armour: Surgical Wards.
THURSDAY.—10 A.M., Dr. Grainger Stewart: Neurological Department. 2 P.M., Dr. Ironside: Medical Out-patients. 2 P.M., Mr. Bishop Harman: Eye Department.
FRIDAY.—10 A.M., Dr. Pritchard: Medical Wards. 2 P.M., Mr. Sinclair: Surgical Out-patients. 2 P.M., Mr. Vlasto: Throat, Nose and Ear Department.
SATURDAY.—9 A.M., Mr. Vlasto: Operation on Throat, Nose and Ear. 9.30 A.M., Dr. Burnford: Bacterial Therapy Department. 10 A.M., Dr. Owen: Medical Diseases of Children.
Daily 10 A.M. to 5 P.M., Saturdays 10 A.M. to 12 noon. Medical and Surgical In-patients and Out-patients. Operations, Special Departments, Anæsthetic Course.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.
MONDAY, Oct. 1st.—2.30 to 5 P.M.: Medical, Surgical, and Gynæcological Clinics. Operations.
TUESDAY.—2.30 to 5 P.M.: Medical, Surgical, Throat, Nose and Ear Clinics. Operations.
WEDNESDAY.—2.30 to 5 P.M.: Medical, Skin and Eye Clinics. Operations.
THURSDAY.—11.30 A.M.: Dental Clinics. 2.30 to 5 P.M.: Medical, Surgical, and Ear, Nose and Ear, Nose and Throat Clinics. Operations.
FRIDAY.—10.30 A.M.: Throat, Nose and Ear Clinics. 2.30 to 5 P.M.: Surgical, Medical, and Children's Diseases. Clinics. Operations.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY, Oct. 4th.—4 P.M., Dr. Cockayne: Cretinism.

ROYAL NORTHERN HOSPITAL, Holloway-road, N.
TUESDAY, Oct. 2nd.—3.15 P.M.: Sir Thomas Horder: Some Functional Diseases of the Heart and Their Treatment.

CENTRAL LONDON THROAT, NOSE AND EAR HOSPITAL, Gray's Inn-road, W.C.
MONDAY, Oct. 1st.—1.30 P.M.: Examination of the Pharynx.
WEDNESDAY, Oct. 3rd.—1.30 P.M.: Examination of the Larynx.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.
THURSDAY, Oct. 4th, at 5 P.M., Dr. J. H. Stowers: Introductory.

EAST LONDON HOSPITAL FOR CHILDREN, Shadwell, E.
WEDNESDAY, Oct. 3rd.—4 P.M.: Clinical Demonstration. Free to Medical Practitioners.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE COURSE.
TUESDAY, Oct. 2nd.—4.15 P.M., Dr. R. S. Paterson: X Ray Work in Diseases of the Urinary Tract.
FRIDAY.—4.15 P.M., Dr. C. H. Melland: Diagnosis, Prognosis, and Treatment of Pernicious Anæmia.

ANCOATS HOSPITAL POST-GRADUATE LECTURES, Mill-street, Manchester.
THURSDAY, Oct. 4th.—3.45 P.M., Dr. W. J. S. Reid: Diseases of Sympathetic Nervous System.

Appointments.

THOMAS, G. R. SEAGER, M.B., B.Chir. Camb., has been appointed Surgeon to the Southampton Borough Police Force.

Bolingbroke Hospital, S.W.: THOMPSON, JOHN H., M.B. Lond., F.R.C.S. Eng., Resident Medical Officer; MORPHY, P. D., *M.C.*, M.B. Glasg., House Surgeon.

Queen Charlotte's Maternity Hospital: HEGGS, G. B. M., M.R.C.S., L.R.C.P. Lond., Senior Resident Medical Officer; COX, A. RAYMOND, M.R.C.S., L.R.C.P. Lond., Assistant Resident Medical Officer.

Certifying Surgeons under the Factory and Workshop Acts: WALKER, J. A., M.B., B.S. Lond. (Poole); MILLAR, G., M.B., Ch.B. Edin. (Crook, Durham).

Vacancies.

For further information refer to the advertisement columns.

Belgrave Hospital for Children, 1, Clapham-road, S.W.—H.S. Also Asst. H.P. Each at rate of £100.

Cambridge, Addenbrooke's Hospital.—H.S. At rate of £130.

Cardiff Royal Infirmary.—Hon. Asst. Surg. to Ear, Nose and Throat Dept.

Derby, Derbyshire Royal Infirmary.—Asst. H.S. and Cas. O. At rate of £150.

Doncaster Royal Infirmary.—Third H.S. At rate of £150.

Gloucester, Standish House Sanatorium, Stonehouse.—Asst. M.O. £250.

Greenwich Metropolitan Borough.—M.O. for Maternity and Child Welfare Work. £600.

Hampstead, General and North-West London Hospital, Haverstock-hill, N.W.—H.S. Also Cas. M.O. and Cas. Surg. O. Each at rate of £100.

Hampstead Hospital for Children, College Crescent, N.W.—Res. M.O. At rate of £100.

Hospital for Consumption, &c., Brompton, S.W.—H.P. At rate of £50.

Hospital of St. John and St. Elizabeth, 60, Grove End-road, W.—Res. H.S. At rate of £75.

Ilford Emergency Hospital, Essex.—Jun. H.S. £90.

Jersey General Hospital and Poor-law Infirmary.—Res. M.O. £200.

Lanark, Infectious Diseases Hospital and Tuberculosis Sanatorium, Roadmeetings, Carluke.—Res. Phys. £350.

Leeds City.—Asst. M.O. for Maternity and Child Welfare. £600.

Lincoln County Hospital.—Jun. H.S. At rate of £150.

Liverpool, Eye and Ear Infirmary, Myrtle-street.—H.S. £100. Also Hon. Asst. Surgeon to Ear, Nose and Throat Department.

L.C.C. Mental Hospital Service.—Eighth Asst. M.O. £300.

London Temperance Hospital, Hampstead-road, N.W.—Res. M.O. At rate of £175. Cas. O. At rate of £120. Also H.P. At rate of £100.

Macclesfield General Infirmary.—Res. H.S. £180.

Manchester, St. Mary's Hospitals.—Four H.S.'s. Each at rate of £50.

Mauritius, Port Louis.—M.O.H. £900.

Mildmay Mission Hospital, Austin-street, Bethnal Green, E.—Sen. Res. M.O. At rate of £140.

Northampton General Hospital.—Asst. H.S. to Ear, Nose and Throat Dept. At rate of £150.

Norwich, Norfolk and Norwich Hospital.—H.S. and Cas. O. Each £120.

Nottingham, General Hospital.—H.P. At rate of £150.

Nuneaton Borough.—Asst. M.O.H. £600.

Paddington Green Children's Hospital, W.—H.S. At rate of £150.

Prince of Wales's General Hospital, Tottenham, N.—H.S., Special H.S., and H.P. Each at rate of £120. Also Jun. H.S. and Jun. H.P. Each at rate of £90.

Queen's Hospital for Children, Hackney-road, E.—Physician-in-Charge Skin Department.

Royal Chest Hospital, City-road, E.C.—Res. M.O. Also H.P. At rate of £150 and £100 respectively.

Royal Free Hospital School of Medicine for Women, W.C.—Res. Asst. Pathologist. £150.

Royal National Orthopædic Hospital, 234, Gt. Portland-street, W. Four Surg. Regs. Each £105.

St. Andrew's Hospital, Dollis-hill, N.W.—Sen. and Jun. Res. M.O.'s. At rate of £150 and £120 respectively.

St. John's Hospital, Lewisham, S.E.—Res. Cas. O. At rate of £100.

St. Mark's Hospital for Cancer, &c., City-road, E.C.—H.S. At rate of £75.

Shanghai Municipal Council, Public Health Dept.—Second Asst. Commissioner of Public Health (Hospitals). £650.

Southampton, Royal South Hants and Southampton Hospital.—Jun. H.S. Also Cas. O. At rate of £130 and £120 respectively.

Southern Rhodesia Medical Service.—Govt. M.O. £500 to £600.

Stoke-on-Trent, North Staffordshire Infirmary, Hartshill.—Hon. Asst. Aural Surgeon.

Ventnor, Royal National Hospital for Consumption, &c., Isle of Wight.—Jun. Res. M.O. At rate of £300.

Warrington, County Mental Hospital, Winwick.—Asst. M.O. £350.

Wolverhampton, Wolverhampton and Staffordshire Hospital.—Two Asst. H.S.'s. Each at rate of £125.

The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Chaddesley Corbett and Halesowen (Worcestershire), Plymstock (Devon), and Hirwain (Glam.).

Births, Marriages, and Deaths.

MARRIAGES.

BINNS—O'SULLIVAN.—On Sept. 19th, at Haverstock-hill, N.W., Raymond Thomas Binns, M.B., B.S., to Anna Mary O'Sullivan.

HALE-WHITE—GOSDEN.—On Sept. 20th, at St. Anne's Church, Eastbourne, Dr. Reginald Hale-White, to Vera, daughter of Mr. and Mrs. John Gosden, of Eastbourne.

MCLAGGAN—ADAMS.—On Sept. 22nd, 1928, at Hampstead, John Douglas McLaggan, F.R.C.S., to Elsa Violet Adams, M.B., B.S.

DEATHS.

BUCHANAN.—On Sept. 23rd, at Westcliff-mansions, Eastbourne, Robert John Bertran Buchanan, late Captain R.A.M.C., aged 48.

KNOX.—Suddenly on Sept. 21st, 1928, in his 61st year, Robert Knox, M.D., C.M., M.R.C.P., M.I.E.E., of 38, Harley-street, and 15, South-grove, Highgate, N.6.

WALKER.—On Sept. 21st, at Maresfield-gardens, N.W., Dr. A. Dunbar Walker, M.D., aged 81.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

THE VISUAL DIAGNOSIS OF DISEASE.*

By E. H. R. Altounyan, *M.C.*, M.D. Camb.,
ASSISTANT SURGEON TO THE ALTOUNYAN HOSPITAL, ALEPPO.

When man first cast a medical eye upon his fellow being, he was faced with a body essentially opaque to light; a body covered with a slippery skin, bossed with bony promontories and with wide stretches of soft and billowy tissue, the few presenting orifices being narrow and leading into cavities uniformly dark and mysterious. Against this body were launched the sustained and tireless efforts of generation after generation of physicians. Their hands took on the delicacy of an insect's antennæ, their ears became trained to catch the softest flutter, and, above all, their eyes became gimlets, capable, in the case of the masters, of penetrating layer after layer to reveal the hidden cause, to expose the secret trouble. With the enhancement of vision came the power to store a series of bright correlated pictures in the mind, capable, like the modern film, of instant and accurate release. With this, too, came the capacity to present in words what the eye had seen, an art which culminated, perhaps, in the clinical teaching of Trousseau, and his great pupil, Dieulafoy. But still the body remained opaque and largely dark.

Domination by the Laboratory.

The rise of the laboratory, shifting the focus of attention away from the living body, ushered in a new era, which must surely be regarded as one of the twilit ages of medicine. As a student, I was just in time to witness the tail end of the darkest phase. Clinicians of international reputation seemed at the mercy of the "lab. boy," who, issuing from a musty and obviously untidy room, removed as far as possible from all contact with living patients, would pronounce fearlessly that this was syphilis and that tubercle, while the other was nothing at all. The issue of this lamentable controversy was not a little confused by the frequent clerical errors of a new and understaffed department, and by the number of dogmas proclaimed by the "test-tube wizards," which had subsequently to be withdrawn. Chaos, indeed, seemed to be just waiting round the corner. I speak not as a scoffer but as one who has served his apprenticeship in the laboratory, and has tasted the joys of this, the most sublimated form of our medical thought. All this is now past history, and the laboratory, after its dastardly attempt to usurp the kingship, has taken its rightful and honourable place. Still the immense, growing complexity of medicine tended, and is still tending, to divide and shift responsibility, to breed callousness and gross ignorance, to promote a narrow and sometimes utterly ridiculous point of view, which impeded knowledge and harmed the patient. It is for these reasons that one must welcome the coming of the next phase which even now perhaps is actually in full flower, this period which will surely be known to succeeding generations as the Age of Vision, the Age of Light. Once more the physician has been given the means to learn much by direct personal observation.

For everywhere over the horizon have appeared specialists, brandishing in their hands tubes; tubes short and long, tubes thick and thin, tubes straight and curved, and each and every one having at one end a small bright light. Thus armed, these gentlemen proceeded, and are at this moment still proceeding, to enter and expose every important region of the living body, while the surgeon with his grosser knife ably keeps them company. Thus at last are we to-day in a position to embark, with the absolute certainty of final mastery, on the study of the "pathology of the living." This phrase, coined some years ago by Sir Berkeley Moynihan, is in my opinion destined to be the slogan of the younger generation. If to-day I might presume to advise a colleague installing himself in general practice, I would say—"Purchase—or, better still, persuade your father to purchase—every kind of illuminated aid to diagnosis, and work out in your office, collaborating with the surgeon in his hospital, the vital and almost unknown problems of living pathology."

The Range of Vision.

What, then, can we see, and how? The answer is, everything, and generally quite easily.

The province of radiology is beyond the grasp of even my sacrilegious hands, yet the discovery of the Coolidge tube and the generalisation of municipal electricity makes it probable that few of us will be without our private, self-worked installations, so I allude to two recent advances of great practical importance. The injection of lipiodol into the cisterna magna and the following of the shadow down the spinal cord is a procedure I never hesitate to practise in all cases of suspected tumour. The puncture between the occiput and the atlas is always rather alarming, but in my own experience and that of others is apparently harmless, and certainly of paramount importance before deciding on laminectomy in all cases of fracture of the vertebræ. The other advance, due also indirectly to the genius of Prof. J. A. Sicard of Paris, is the injection of lipiodol into the bronchi. I have just received from Dr. Alton Ochsner, nephew of the late Ochsner of Chicago, an ingenious and simple technique for the introduction of the oil into the trachea. Like many great discoveries, it was stumbled upon accidentally by an alert mind. If you anæsthetise the pharynx of a person with cocaine, the larynx will receive automatically anything you put into his mouth. You then ask your patient to take a 20 c.cm. cocktail of lipiodol, and the trick is done. Thus yet once again has a valuable and apparently highly intricate procedure passed into the realm of everyday practice.

The ophthalmoscope was popularised in England by a general physician, the late Sir Clifford Allbutt of Cambridge. There is no reason, surely, why any one of us should not get a valuable glance at the fundus in cases of cerebral compression or renal disease, if we can only brave the sneers of the oculist and use a mydriatic. The ear, though apparently so accessible, caused me much trouble, until I adopted the routine use of Siegel's speculum. It seems necessary to point out that any one of us may be called upon to perform a paracentesis of the drum, and that we cannot do so with safety unless we have a working knowledge of the tympanum. It occasionally, too, adds not a little to our reputation, if we can differentiate furunculosis of the external auditory meatus from a perforation, and above all if we avoid sending to a specialist a case suffering from impacted cerumen, or a long-forgotten plug of cotton-wool. As regards the nose, I would remark that there can be surely nothing simpler than to familiarise oneself with the fact that all septa are more or less deviated, a knowledge which may occasionally save a patient from the too enthusiastic resector. And why not transilluminate the antra? A diagnosis of suspected empyema of the left antrum of Highmore may not infrequently help to maintain a laudable respect for us in our colleague across the road, who has to treat the condition. And why, in the name of science and common sense, should we not look for and treat that dilated vein that trickles on the nasal septum, so close to the anterior nares, that vein which is found in more than half the cases of epistaxis?

Is this dabbling? I think not; and the reward is great, while neglect is sometimes costly. For instance, a girl of 6 was brought to me with the history that since birth she had never been able to breathe through her nose. She had huge tonsils, and I was able to palpate a considerable mass of adenoids. After the removal of these, I was much surprised to find that the child remained a confirmed mouth-breather. Various attempts were made to bully the child into breathing through her nose, until at last I made the crucial experiment of closing the mouth with a broad strip of sticking-plaster. This I had hastily to remove 30 seconds later to prevent death from suffocation. The girl had, indeed, never breathed through her nose, for the excellent reason that the nose was completely shut off from the nasopharynx by a velum of mucous membrane stretching across both choanæ. Had I not been too lazy to do a posterior rhinoscopy much trouble, including an entirely futile radiogram, would have been avoided. Tonsils are easy enough to see, but how often do we neglect one simple manœuvre in our inspection. It is essential not only to see their outer aspect, but by careful and systematic palpation with a spatula to ascertain whether the tonsillar crypts contain pus or cheesy matter. Very often this simple procedure will open up a minute abscess.

With the larynx I always use, first, the indirect method, but often direct laryngoscopy by the Jackson technique is necessary, especially in children suspected of laryngeal or tracheal diphtheria. The following case is of interest. A man, aged 20, consulted me for the removal of a tracheotomy tube which he had been wearing for a year. Indirect laryngoscopy revealed a round bilobulated tumour in the region of the vocal cords. Direct laryngoscopy in the Jackson-Boyce position enabled me to diagnose complete absence of the epiglottis, and complete occlusion of the larynx by a velum of mucous membrane which covered the two arytenoids and gave a tumour-like appearance to these structures. A bougie placed between the arytenoids could find no entrance into the glottis. This diagnosis was clinched by subsequent operation from below.

The visibility of the stomach apart from X rays still leaves much to be desired. So we often open the abdomen

* Being an address delivered before the Sixth Medical Conference of the American University of Beyrouth.

and paw about with the anterior surface of the stomach and duodenum. We have learnt by sad experience that "lucky shot" gastro-enterostomies often lead to disasters, yet if, when the findings are negative, we want to be sure that no ulcer is present, we become involved in a somewhat lengthy surgical procedure. I cannot see why the suggestion of Devine of Australia should not be adopted. He introduces through a puncture in the anterior gastric wall a special endoscope (an ordinary urethroscope would do) and by gentle air inflation succeeds in getting a comprehensive view of the mucous membrane. This appeals to me as an essentially safe method.

Hæmorrhoids were, in my student days, considered to be something usually invisible and impalpable. It is true that an advanced young surgeon used a sigmoidoscope, but there was much talk of rupture of the rectum, and a general anæsthetic was advised. Personally I find sigmoidoscopy one of the easiest of procedures. I use it invariably in all cases of chronic diarrhœa, and prefer to test for amœba by direct swabs, taken through the sigmoidoscope, of any suspicious ulcer. The London St. Mark's Hospital hæmorrhoidal speculum reveals hæmorrhoids with absolute precision, and it is usually easy to define which particular group is responsible for a hæmorrhage.

I still hear of operations on kidneys being performed by surgeons of repute without previous cystoscopy. I can imagine no circumstances justifying such an omission, unless it be the case of traumatic rupture of one kidney, where immediate nephrectomy may be required to save life. And yet can any procedure be simpler? We are all at least expected to be able to pass a catheter, and I am sure we all do frequently, and yet I find my colleagues hesitating to pass one when it has a light at one end.

For the differentiation of renal function I prefer the intramuscular injection of 30 cg. of indigo carmine in 5 c.cm. of sterile water, and examination of the ureters 20 minutes later. Catheterisation of the ureters may be extremely difficult, but is usually easy, and the dye greatly facilitates their location in the exceptional case.

Exploration of the Thorax.

It is fitting at this point to pay a heartfelt tribute to the name of the great specialist, Chevalier Jackson of Philadelphia, whose unswerving devotion and research have been the means of saving in a direct and unquestionable manner more lives than, I believe, any other man of the present day. In his published work (and this is the point I wish especially to make) he devotes much space, in an enthusiastic and wholly infectious manner, to persuading everybody to "have a go at" those awesome and so often fatal channels, the trachea and œsophagus. I may be wrong; but I believe I can count on the fingers of one hand those of my colleagues who in this country assiduously practise this most beneficent art. And yet throughout every village and town in Syria little children are swallowing hard, attractive, and terrible objects, and every now and again some old man or woman will attempt to digest his own false teeth. We must put this matter right at once. Here is my own personal experience. The art is undoubtedly difficult. Jackson maintains that no anæsthetic of any kind should be used in children and only light local anæsthesia in the case of adults. I confess that, except in babies, where it is surprisingly easy, and old edentulous men, I have had recourse to a general anæsthetic and a complete set of tracheotomy instruments, ready for instant use. However, under these conditions, I have seen a number of strictures. I have extracted by sight a coin the size of a halfpenny, from the œsophagus of a girl aged 5, three months after this coin had mysteriously disappeared from the family purse; and I have followed a bead down the right bronchus of a boy of 6, when, luckily for us both, perhaps, he coughed violently, swallowed it into his stomach and passed it in the stool safe and sound the next morning. It was a bright red glass bead, to me more precious than a ruby.

It was in 1923 at the Brompton Hospital, that, under the guidance of Mr. Tudor Edwards, I first saw with a Jacobæus thoracoscope a tumour of the lung. I confess I did not see much, but I saw enough not to be discouraged. At Aleppo it is now the practice in the pneumothorax department of the hospital to thoracoscope any patient presenting moderate adhesions just sufficient to prevent a complete collapse (where such is desirable) and every patient in the general clinic with a pleural effusion, in whom a tumour is suspected. The technique is as follows. After a sufficient insufflation of air, preferably on the previous day, a wide intercostal space is chosen and a thorough infiltration made with 2 per cent. novocaine of skin fascia muscle and pleura. Through a small cut through the skin, a large, special, valved cannula with trocar is pushed firmly through into the interpleural air space. The trocar is withdrawn and a straight endoscope is introduced. I shall never forget my first personal case. My eye discovered an immense lighted cavern; in the distance could be seen the bluish mottled mass of collapsed lung, like some primæval mammoth slowly heaving in his sleep; the walls of the magic cave, the parietal pleura, were glistening pink, streaked with brilliant blood-vessels, the ribs showing white and clean like rock strata beneath. Across the spacious air stretched a thin white glittering band of adhesion, tethering and puckering the lung to the wall. Near the base, between the lung and the diaphragm, thicker and shorter fleshy adhesions could be seen like the joined stalactites and stalagmites of some limestone cave in Derbyshire. The immediate excuse for this pleasure trip was an attempt to sever the adhesions with a cautery. This I attempted, but without success, or damage. The work of Jacobæus of Stockholm shows that this is not only possible, but desirable, though the actual number of cases where it is feasible is apparently small. In another case of pleural effusion in an old man, after the fluid had been evacuated and replaced by air, following the technique of Dr. L. S. T. Burrell, I satisfied myself by thoracoscopy that there was a growth of the pleura to account for the effusion.

I consider thoracoscopy to be indicated in cases undergoing compression treatment, in order to investigate the degree of collapse, where a thickened pleura does not permit of a clear definition of the lung by X rays. In Aleppo we attach much importance to radiographic control before each insufflation.

Abdominoscopy.

Abdominoscopy I began on my own in 1924, having heard rather vaguely that some surgeons were trying it in America. My own cases up to date are exclusively confined to patients with ascites. I use the Jacobæus thoracoscope, and proceed as follows. The fluid is evacuated through the cannula under local anæsthesia. The evacuation should be as complete as possible, as even a little fluid spoils the picture. Using the same cannula, I introduce filtered air by means of the pneumothorax apparatus. The abdominal respiration is well shown on the water manometer, and is of course just the converse of the thoracic type. A usual pressure at the end of insufflation, when the abdominal wall is well ballooned out and separated by a definite air space from the intestines, is between plus 10 and plus 14. The actual quantity of air used varies greatly, but I have used up to two litres without discomfort to the patient. The endoscope is then introduced, and can be passed quite painlessly to and fro under the lighted dome of the anterior abdominal wall. In a favourable case one sees the intestines flattened out as after the removal of a large ovarian cyst; portions of the liver, gall-bladder, spleen, stomach, and, in the Trendelenburg position, the ovaries and uterus have all been seen. In one case, a child of 3½ I was able to satisfy myself that the tuberculous process for which he had been operated on six months previously was receding. This child only had local anæsthesia and made absolutely no complaint throughout the examination. In a man of 70, I was able to avoid a useless laparotomy by observing a growth involving the gall-bladder and numerous metastases scattered all over the under surface of the parietal peritoneum. Thus, too, it is usually easy in most cases to differentiate between tuberculous and cirrhotic ascites, and I feel sure that most growths can actually be seen. The view, indeed, obtained compares favourably with that obtained by the usual laparotomy incision. Dr. O. E. Nadeau of Chicago, a notable pioneer in this branch, has, as he has been kind enough to inform me, devised a technique which is surely destined to deal a death blow to the operation of exploratory laparotomy in chronic cases, an operation which we even now practise, not without a twinge of conscience, not without a sense of shame. Using a flexible cannula, a Braasch cystoscope and a common foot pump, he has proceeded to blow up, enter, and examine a whole series of non-ascitic abdomens with perfect impunity and evident satisfaction. Personally, I intend to continue to use the pneumothorax apparatus and a fine Riviere cannula to obtain my first air pocket, before introducing the larger instrument.

Abdominoscopy has undoubtedly a great future. Among other things it may help to solve is the precise mechanism of the evacuation of the gall-bladder, a problem which Graham is attacking from another angle by cholecystography.

The Unity of the Body.

What, then, is the conclusion of the whole matter?

Under the great sweeping flood that represents the growing complexity of modern medicine, let us not allow ourselves to be submerged. Let us hold fast to that great life-saving conception of the essential unity of the human body. Let us oppose fearlessly those currents of medical thought that tend to isolate, arbitrarily and to the detriment of true knowledge, the various segments of this one great subject. Let us welcome all methods, all discoveries, that help the one man in charge of the one patient to broaden the base of his attack, to widen the sweep of his beneficent vision, remembering always that (let the specialist rage never so fiercely) Diagnosis is the sovereign right of every physician.

RECREATION IN CONVALESCENCE.

ONE of the severest tests of clinical skill comes when the doctor is asked to direct a patient towards active life after a serious or crippling illness. An American institution, the Burke Foundation, White Plains, N.Y., has tackled this problem with characteristic enthusiasm and ingenuity.[1] Sixty acres of land provide ample space for the 300 patients, and the staff consists of two resident physicians, a small nursing corps, and a supervisor of recreation. The contrast between this organised convalescence and the practice at English homes is a striking one. The Director gives golf the highest place among re-educational games. Patients start on simple short courses, with holes ranging in length from 10 to 70 yards, and use solid rubber practice balls and any old clubs available which they keep in order themselves at negligible cost. Those on crutches and those who cannot bend are helped by companions, and the exercise well-nigh fulfils the ideal: outdoor exercise of the entire body, intense interest, wholesome competition and self-grading of exertion. In this institution walking is organised to a fine art. Patients proceed, in the words of the pamphlet, "from crutch and cane hobbling to extended speed hiking," from strolling to meals or the canteen or entertainment hall to walking as far as a distant arbour or hammock and finally to nature-study or shopping expeditions. The trouble with walking is that in this age it is not considered an interesting occupation, but no such objection is raised to dancing. Patients who cannot walk well can achieve the quiet gliding movements of modern dancing, and rest periods can be ensured by providing entertainment items between dances. The number of middle-aged and elderly people who renew a certain measure of youth by modified participation in the dances is surprising. To the sound of clinking metal alone is ascribed some of the value of quoit-throwing, which is a safe, all-round, intermittent exercise. Football sounds strenuous, but a football lying about will often tempt a crutched patient to propel it cautiously with one foot. Fives, played with old tennis balls on shortened distances, can be very valuable if the patients are carefully watched for overstrain. If a captive ball is to be used, where expense is an object, thick wooden paddles should replace the racquets, and an old tennis ball be covered with a sturdy canvas or leather cover. Tennis played over a sagging net, with some relaxation of the rules, can be a very satisfying recreation for convalescents. Mankind has played with a ball from the dawn of history and very often the first step forward that an introspective convalescent can be persuaded to take is to handle, squeeze, toss, bounce, or kick a ball. Unrestricted ball play, no matter how bizarre, should be possible for every convalescent. Bowls has been played from a wheel-chair at White Plains, and croquet is also suitable for crippled patients. We are accustomed to think of putting the weight and throwing the hammer as exercises for brawny giants at athletic gatherings, but if light apparatus is kept prominently in view nearly every man will pick up a piece from time to time and test himself cautiously. The winter season is a more serious matter in New York than it is in this country, but the director notes that the convalescent shrinks far more from wind than from cold, and that he should be urged out to walk and play in sheltered courts. Semi-invalids who are shut indoors rapidly develop mild depressions and irritabilities, and, if they must be kept in, ample indoor exercise must be available. Billiards, dancing, gymnasium, and table games are easily provided. It is interesting to learn that gambling has been sternly repressed at the Burke Foundation, not from any moral prejudice, but because it proved anti-convalescent. The player for money grows strained, restless, irritable, quarrelsome, uncoöperative, and adopts bad postures. Those in charge of convalescents should read this little book. The organising of graded exercise may not be easy if the patient is not in an institution where he can compete with others in like state, but his doctor could often arrange for competition of suitable severity to be provided by his friends.

MEDICAL PHOTOGRAPHY.

Messrs. KODAK, Ltd., Kingsway, W.C., announce the establishment of a special department for photography, subdivided into the three sections of radiography, clinical photography, and medical and surgical cinematography. A pamphlet, entitled X Ray News, deals with the use of the intensifying screen in radiography, sketching the development of this valuable apparatus. The Rheinberg filters for clinical microscopy, described in some detail, are designed to show the section illuminated in one colour against a background of another. The method is a refinement which should have its use in cases where staining is difficult or unsatisfactory.

[1] Recreational Therapy in Convalescence, and Allied Subnormal Health Conditions. Frederic Brush, M.D., Medical Director. Issued through the Sturgis Fund.

ULTRA-VIOLET APPARATUS.

THE MEDICAL SUPPLY ASSOCIATION, Ltd., of 167-185, Gray's Inn-road, London, W.C., have placed on the market under the name of Medisun a small mercury lamp designed as a source of ultra-violet radiation of moderate intensity with a corresponding current consumption. The quartz burner is placed in a deep metal hood supported on a wide aluminium base containing the series resistance, the whole instrument being small and portable. The burner is made in two forms for use on direct or alternating current, and since, in the latter case, a special transformer is required, the price is increased from £10 to £18. The direct current instrument consumes about 1 ampère and hence is very economical in running costs. The alternating type requires considerably more current, from 2·5 to 4·5 ampères according to the voltage of the supply. Like all mercury arcs, the Medisun uses more current on starting up, but not beyond the range of an ordinary house lighting circuit. The quality of the radiation generated by this small lamp is apparently identical with that of the large quartz mercury arcs.

The catalogue of the COX CAVENDISH ELECTRICAL CO. (105, Great Portland-street, London, W.) contains, besides a list of apparatus supplied for ultra-violet therapy, a number of short extracts from books and papers, describing what may be achieved by its use, and a bibliography for further reference. The apparatus is of large range, including mercury, carbon, cored-carbon, and tungsten arcs of various types and standard makes (Hanovia, Hewitic, Cox Cavendish). An interesting piece of mechanism is the Water Steriliser (Hewitic) which employs ultra-violet radiation from a quartz mercury lamp and will, it is claimed, sterilise water at the rate of 140 gallons per hour. Several small ultra-violet lamps for use in the home are described, including (on a separate leaflet) a small mercury lamp. The radiation from such a lamp will be rich in the shorter wavelengths and for that reason more effective in skilled hands than the carbon or cored arcs, but it should be borne in mind that the dangers of blistering the skin and damaging the eyesight have been proportionately increased. The absolute necessity of wearing efficient goggles is not yet realised by the public, and no opportunity should be missed of emphasising the point.

A catalogue published by Messrs. WATSON of Sunic House, Kingsway, is a concise but representative list of lamps and accessories for ultra-violet therapy. It contains, besides the actual specifications, mush useful information for the practitioner who wishes to select suitable apparatus. Such matters as cost of running, repairs, and the use of goggles are treated fully. A short section is devoted to infra-red radiation, and a few instruments for measuring intensity of radiation are included.

X RAY APPARATUS.

Messrs. WATSON issue also a small booklet with this title describing the Muller Hot Cathode Tube for which they are agents in this country. The cathode of this tube contains an electrically heated filament which generates the electrons carrying the current. It is claimed that the Muller tube does not often break down owing to perforation of the glass, since the residual gas in the tube is helium which allows of a higher pressure than normal. In some of the tubes described the filament is so arranged as to project a line focus on the anode which is much blunter than in the usual type of tube. Viewed from the direction of the principal X ray beam, the line focus is seen end on and is thereby reduced to the dimensions of a spot. The intensity of the X rays generated remains unchanged but the heating effect of the discharge is distributed over a larger area. Line focus tubes are made both in air-cooled and in water-cooled types for various strengths of current. Tubes of this type require special care in adjustment as a rotation in the holder results in an apparent broadening of the focus and consequent loss in detail.

Another catalogue of the same firm describes various interesting types of apparatus designed to accommodate the Metalix tube for diagnostic work. In the combined couch and screening stand one tube can be used for all positions over and under couch and for upright screening at a wide range of focal distance. Adjustment of the tube can be made swiftly without disturbing the patient, and there is a saving in cost and weight without sacrifice of safety. A copy of this catalogue will be sent post free on application.

BRADFORD MUNICIPAL GENERAL HOSPITAL.—At the annual distribution of prizes and certificates, the medical superintendent, Mr. B. Holroyd Slater, spoke of the great increase in the work. Quite recently, he said, there were so many operations to be performed that the staff were working continuously in the theatre from 8.30 one morning until 2.30 the following morning. The nurses, he added, were living under "miserable conditions."